3. FOS Release B Formal Test Results

This section contains detailed results for the FOS Release B Formal Test Period, held from June 1 to Sept 1, 1997 at the ECS facility at the Goddard Space Flight Center (GSFC), Greenbelt, Maryland.

3.1 FOS Test Program Context

Following successful completion of the FOS Consent to Ship Review (CSR), the FOS software is installed at the EOS Operations Center (EOC) facility at GSFC and made available for formal acceptance testing. At this time, the FOS Formal Test Phase is begun; formal acceptance testing includes the execution of functional tests designed to verify requirements (FOS level 4, IRD and RBR requirements) and end-to-end tests designed to ensure concurrent operational functionality. Formal testing also includes the execution and reporting of all regression tests executed following patch deliveries. All tests conducted during this period, including thread, end-to-end, hardware, and regression tests are currently defined in the FOS Release B Integration & Test Procedures document (322-CD-007-002/411-CD-007-002). Results reported in this document are a direct result of test procedure conduct using the test suite as shown in the test case list provided in Table 3.1-1.

Table 3.1-1. FOS Release B Test Suite (1 of 4)

Test Title	Test Name	Associated Test Group
ANA-2000B	Data Generation - General Analysis	Analysis
ANA-2010B	Standing Order Manager	Analysis
ANA-2020B	Spacecraft Clock Correlation Based on RDD Method	Analysis
ANA-2030B	Spacecraft Clock Correlation Based on USCCS Method	Analysis
ANA-2040B	Special Processing Algorithms	Analysis
ANA-2060B	Time Order Downlink Report	Analysis
ANA-2070B	Parameter Out of Limits Report	Analysis
ANA-2090B	Analysis Products- Crossing Database Boundaries	Analysis
ANA-2100B	System Generated Statistics	Analysis
ANA-2110B	User Specified Statistics	Analysis
ANA-2120B	Analysis Request Manager	Analysis
ASTER-2000B	ASTER Scheduling & IST Access	External Interface
CMD-2000B	Command Authorization	Command
CMD-2001B	Command Generation	Command
CMD-2010B	Ground Script Control	Command

Table 3.1-1. FOS Release B Test Suite (2 of 4)

Test Title	Test Name	Associated Test Group
CMD-2015B	Ground Script Commanding	Command
CMD-2030B	Manual Commanding	Command
CMD-2050B	Uplink Loads	Command
CMD-2070B	Command Modes, Transmission, and Uplink	Command
CMD-2080B	Cmd. Tlm Ver.and Receipt Verification	Command
CMS-2000B	Memory Dump Image	Command Management
CMS-2040B	Table Load Validation & Generation	Command Management
CMS-2060B	Microprocessor & FSW Load Generation	Command Management
CMS-2090B	ATC Load Generation & Validation	Command Management
CMS-2100B	ATC Load Management	Command Management
CMS-2170B	Validate and Generate RTS load Contents	Command Management
CMS-2180B	RTS Load Management	Command Management
CMS-2190B	Table Load Management	Command Management
CONT-2010B	DSS	End-to End
CONT-2020B	Spacecraft Activity Log	End-to End
CONT-2030B	SSR Monitoring	End-to End
CONT-2040B	Spacecraft State Check	End-to End
DBS-2000B	DB Ingest/Validation & ODF Generation	Data Base
DBS-2010B	Operational Data Backup/Restore	Data Base
DBS-2020B	Database Reporting	Data Base
DBS-2030B	Database Editing	Data Base
EDOS-2000B	CODA Receipt and Processing	External Interface
EDOS-2001B	Ground TLM Analysis	External Interface
EDOS-2002B	Test Cmd/ Echo Exchange	External Interface
EDOS2010B	SCS Summary Report Processing	External Interface
EDOS-2030B	Receive and Forward Trash Buffer Data	External Interface
ETE-2000B	Concurrent OPS/Performance Monitor	End-to-End
ETE-2010B	ECT2 Scenario	End-to-End
ETE-2050B	Year 2000	End-to-End
EVT-2000B	Event Mssage Display & Evt Graphical Timeline	Events
EVT-2010B	Event Message Filtering	Events
EVT-2020B	Event History Request & Reporting	Events
EVT-2030B	Alarm MessageHandling	Events
FDF-2000B	FDF Product Receipt	External Interface
FUI-2000B	Screen Management	User Interface
FUI-2020B	User Customization	User Interface
FUI-2025B	Data Mover	User Interface

Table 3.1-1. FOS Release B Test Suite (3 of 4)

Test Title	Test Name	Associated Test Group
FUI-2030B	Display Builder - Alphanumeric Pages	User Interface
FUI-2040B	ECL Directives	User Interface
FUI-2050B	Procedure Builder	User Interface
FUI-2060B	Procedure Control and Execution	User Interface
FUI-2080B	OASIS/CSTOL Conversion	User Interface
FUI-2090B	User Authentication & Display	User Interface
FUI-2100B	Room Builder	User Interface
FUI-2110B	Display Builder - Graphs & Tables	User Interface
FUI-2115B	Display Builder - Schematics	User Interface
FUI-2120B	Document Reader	User Interface
FUI-2130B	E-Mail	User Interface
FUI-2140B	Quick Message Generator	User Interface
FUI-2150B	On-line HELP	User Interface
HRD-2000B	EOC Hardware	Operations
IST-2000B	IST Pool Management	End-to-End
IST-2010B	IST Functionality	End-to-End
NCC2020B	NCC GCMR Processing	External Interface
NCC-2030B	Request/Analyze User Performance Data (UPD)	External Interface
NCC-2040B	Ground Telemetry Replay	External Interface
OPR-2000B	Functional Requirement Analysis	Operations
PAS-2000B	Activity Definer Tool	Planning and Scheduling
PAS-2010B	BAP Definer Tool	Planning and Scheduling
PAS-2020B	General Scheduler	Planning and Scheduling
PAS-2030B	EOC Timeline-Display & Manipulation	Planning and Scheduling
PAS-2035B	EOC-Timeline Management	Planning and Scheduling
PAS-2040B	Contact Schedule	Planning and Scheduling
PAS-2050B	Activity Constraint Definitions	Planning and Scheduling
PAS-2110B	Scheduling Load Uplink Activities	Planning and Scheduling
PAS-2180B	Receive and Schedule Late Change Requests	Planning and Scheduling
PAS-2190B	What-If Planning & Scheduling	Planning and Scheduling
PAS-2200B	DAS Generation	Planning and Scheduling
SAS-2000B	Remote Access and Carry-Out File Transfer	External Interface
SYS-2000B	FOS Server and User Station Startup and Shutdown	System
SYS-2020B	Logical String Config, Cntrl, & Termination	System

Table 3.1-1. FOS Release B Test Suite (4 of 4)

Test Title	Test Name	Associated Test Group
SYS-2030B	Failure Recovery and Status Monitoring	System
TLM-2000B	Decom- Health & Safety/Standby Tlm	Telemetry
TLM-2010B	Decom-Housekeeping Telemetry	Telemetry
TLM-2020B	Decom- Context Dependent Telemetry	Telemetry
TLM-2030B	Engineering Unit Conversion	Telemetry
TLM-2040B	User Adjust of EU Conversion Algo's and Coefficients	Telemetry
TLM-2050B	Multi-Byte Parameter Processing	Telemetry
TLM-2060B	Derived Parameter Processing	Telemetry
TLM-2070B	Data Quality Determination	Telemetry
TLM-2080B	Red/Yellow Limits Processing	Telemetry
TLM-2090B	Delta Limits Processing	Telemetry
TLM-2100B	Info Window	Telemetry
TLM-2150B	Real-time Data Dropout	Telemetry
TLM-2160B	Real-time Telemetry Archive and Merge	Telemetry
TLM-2170B	Multiple Source TLM Data Rec't & Display	Telemetry
TLM-2190B	Telemetry Replay Processing and Display	Telemetry

3.2   FOS Testing During the Formal Test Phase

The FOS Release B Formal Acceptance Test Suite was conducted between June and August, 1997 at the EOC at GSFC, Greenbelt, Md. The test suite was conducted by the joint effort of the FOS Test and System Management Office (SMO) Acceptance Test (ATO) organizations and was witnessed by cognizant NASA, Quality Assurance (QA) and Independent Verification & Validation (IV&V) personnel.

For each test conducted, a test log was completed, detailing the successes/failures of each test, deviations made to procedures, NCRs written or verified as fixed, and a complete description of the as-run tests. Following the conduct of each test, the FOS Test Team determined the status of assigned requirements (i.e. verified passed, verified partial pass, verified failed, or not tested) and indicated status for each associated Level 4, RBR and IRD requirement. This was performed for all tests in the FOS test suit. The following sections provide the general and detailed results of this formal test period.

3.3   FOS Release B Formal Test Results

During the FOS Release B formal test timeframe, eighty-six test cases were executed and sixteen test cases were not performed. Test Status was assigned for all test cases as Pass, Partial Pass or Fail. Pass test status is assigned to a test when the test fully meets the success criteria stated in the test procedures. Partial Pass test status is assigned when the test partially meets the success criteria stated in the test procedures. Failed test status occurs when most of the functionality of

the test performed was not met, or when a test was not executed. Forty-four tests fully passed as success criteria identified was fully met; forty-two tests were partially met with minor flaws in associated functionality. Sixteen tests were not executed (see Table 3.3-1).

Table 3.3-1. FOS Formal Test - Release B (1 of 3)

Test Title	Test Name	Test Status
ANA-2000B	Data Generation - General Analysis	Partial/Pass
ANA-2010B	Standing Order Manager	not executed
ANA-2020B	Spacecraft Clock Correlation Based on RDD Method	not executed
ANA-2030B	Spacecraft Clock Correlation Based on USCCS Method	not executed
ANA-2040B	Special Processing Algorithms	not executed
ANA-2060B	Time Order Downlink Report	not executed
ANA-2070B	Parameter Out of Limits Report	not executed
ANA-2100B	System Generated Statistics	not executed
ANA-2110B	User Specified Statistics	Partial/Pass
ANA-2120B	Analysis Request Manager	not executed
ANA-2090B	Analysis Products- Crossing Database Boundaries	Partial/Pass
ASTER-2000B	ASTER Scheduling & IST Access	Partial/Pass
CMD-2000B	Command Authorization	Pass
CMD-2001B	Command Generation	Pass
CMD-2010B	Ground Script Control	Partial/Pass
CMD-2015B	Ground Script Commanding	Pass
CMD-2030B	Manual Commanding	Partial/Pass
CMD-2050B	Uplink Loads	Partial/Pass
CMD-2070B	Command Modes, Transmission, and Uplink	Partial/Pass
CMD-2080B	Cmd. Tlm Ver.and Receipt Verification	Pass
CMS-2000B	Memory Dump Image	Partial/Pass
CMS-2040B	Table Load Validation & Generation	Pass
CMS-2060B	Microprocessor & FSW Load Generation	Pass
CMS-2090B	ATC Load Generation & Validation	Pass
CMS-2100B	ATC Load Management	Pass
CMS-2170B	Validate and Generate RTS load Contents	Partial/Pass
CMS-2180B	RTS Load Management	Pass
CMS-2190B	Table Load Management	Pass
CONT-2010B	DSS	Pass
CONT-2020B	Spacecraft Activity Log	Pass
CONT-2030B	SSR Monitoring	Partial/Pass
CONT-2040B	Spacecraft State Check	Pass

Table 3.3-1. FOS Formal Test - Release B (2 of 3)

Test Title	Test Name	Test Status
DBS-2000B	DB Ingest/Validation & ODF Generation	Pass
DBS-2010B	Operational Data Backup/Restore	Pass
DBS-2020B	Database Reporting	Partial/Pass
DBS-2030B	Database Editing	Pass
EDOS-2000B	CODA Receipt and Processing	Partial/Pass
EDOS-2001B	Ground TLM Analysis	not executed
EDOS-2002	Test Cmd/Echo Exchange	not executed
EDOS-2010B	SCS Summary Report Processing	not executed
EDOS-2030B	Receive and Forward Trash Buffer Data	Partial/Pass
ETE-2000B	Concurrent OPS/Performance Monitor	Partial/Pass
ETE-2010B	ECT2 Scenario	Pass
ETE-2050B	Year 2000	Partial/Pass
EVT-2000B	Event Mssage Display & Evt Graphical Timeline	Pass
EVT-2010B	Event Message Filtering	Pass
EVT-2020B	Event History Request & Reporting	Partial/Pass
EVT-2030B	Alarm MessageHandling	Pass
FDF-2000B	FDF Product Receipt	Partial/Pass
FUI-2000B	Screen Management	Partial/Pass
FUI-2020B	User Customization	Partial/Pass
FUI-2025B	Data Mover	Pass
FUI-2030B	Display Builder - Alphanumeric Pages	Partial/Pass
FUI-2040B	ECL Directives	Partial/Pass
FUI-2050B	Procedure Builder	Partial/Pass
FUI-2060B	Procedure Control and Execution	Partial/Pass
FUI-2080B	OASIS/CSTOL Conversion	Pass
FUI-2090B	User Authentication & Display	Partial/Pass
FUI-2100B	Room Builder	Partial/Pass
FUI-2110B	Display Builder - Graphs & Tables	Partial/Pass
FUI-2115B	Display Builder - Schematics	Pass
FUI-2120B	Document Reader	Pass
FUI-2130B	E-Mail	Partial/Pass
FUI-2140B	Quick Message Generator	Pass
FUI-2150B	On-line HELP	Partial/Pass
HRD-2000B	EOC Hardware	Partial/Pass
IST-2000B	IST Pool Management	not executed
IST-2010B	IST Functionality	Partial/Pass

Table 3.3-1. FOS Formal Test - Release B (3 of 3)

Test Title	Test Name	Test Status
NCC- 2020B	NCC GCMR Processing	Pass
NCC-2030B	Request/Analyze User Performance Data (UPD)	Pass
NCC-2040B	Ground Telemetry Replay	not executed
OPR-2000B	Functional Requirement Analysis	Partial/Pass
PAS-2000B	Activity Definer Tool	Partial/Pass
PAS-2010B	BAP Definer Tool	Partial/Pass
PAS-2020B	General Scheduler	Pass
PAS-2030B	EOC Timeline-Display & Manipulation	Pass
PAS-2035B	EOC-Timeline Management	Partial/Pass
PAS-2040B	Contact Schedule	Partial/Pass
PAS-2050B	Activity Constraint Definitions	Pass
PAS-2110B	Scheduling Load Uplink Activities	Partial/Pass
PAS-2180B	Receive and Schedule Late Change Requests	Pass
PAS-2190B	What-If Planning & Scheduling	Pass
PAS-2200B	DAS Generation	Partial/Pass
SAS-2000B	Remote Access and Carry-Out File Transfer	Pass
SYS-2000B	FOS Server and User Station Startup and Shutdown	Pass
SYS-2020B	Logical String Config, Cntrl, & Termination	Partial/Pass
SYS-2030B	Failure Recovery and Status Monitoring	Partial/Pass
TLM-2000B	Decom- Health & Safety/Standby Tlm	Pass
TLM-2010B	Decom-Housekeeping Telemetry	Pass
TLM-2020B	Decom- Context Dependent Telemetry	not executed
TLM-2030B	Engineering Unit Conversion	Pass
TLM-2040B	User Adjust of EU Conversion Algo's and Coefficients	Pass
TLM-2050B	Multi-Byte Parameter Processing	Pass
TLM-2060B	Derived Parameter Processing	not executed
TLM-2070B	Data Quality Determination	Pass
TLM-2080B	Red/Yellow Limits Processing	Partial/Pass
TLM-2090B	Delta Limits Processing	Pass
TLM-2100B	Info Window	not executed
TLM-2150B	Real-time Data Dropout	Pass
TLM-2160B	Real-time Telemetry Archive and Merge	Pass
TLM-2170B	Multiple Source TLM Data Rec't & Display	Pass
TLM-2190B	Telemetry Replay Processing and Display	Pass

3.3.1 FOS Subsystem - General Results

This section defines general FOS capabilities verified bv the FOS and ATO organizations for each of the FOS subsystems via the execution of the FOS Release B Test Suite during the formal test phase (detailed information on requirement status for each test is available in Section 3.3.2)

Table 3.3.1-1 General FOS Capabilities (1 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
PAS	Activity Definer	Insert commands, activities, PROCS w/out
		arguments, default scheduling info
		Define paramete values
		Save, delete, & modify
	BAP Definer Tool	Insert activities, scheduling info
		Modify parameter values
		Save, delete, & modify
	General Scheduler	Sched activities, PROCs, command, & BAP
		Retrieve activity & default sched info
		Un-schedule activity
	EOC Timeline -	Open (Master/What-ifs) & save plans
	Display/Manip	Edit functions
		Save/load configuration files
		Manipulations
		Permissions
	EOC Timeline -Mgmt	Manage multiple plans concurrently
	Contact Scheduler	Single/batch scheduling
		Algorithm processing
	Activity Constraint Definer	Define activity constraints
		Filtering
	Receive & Schedule	ATC/DAS load generation
		Late changes
	Sched Load Up-link	Schedule load uplinks
	What-If Planning	Create what-if plans on timeline
		View, save, and delete options
	DAS Generation	Create activities to build ATC load, validate cmd constraints, & populate a DAS period
		Notification of constraint violations
		Hard constraints prohibit DAS generation
Command Mgmt	Memory Dump Image	Dump & store S/C memory
		Verify dump compare (load.img to load.img, dump file to dump file, dump file to load.img)

Table 3.3.1-1 General FOS Capabilities (2 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
		Enable user to overwrite ground reference image
	Table Load Valid & Gen	User generation of table load file
		Pre-defined templates used to define tables per DB
		Store uplink load data, image, report, & catalog entry
	Micropro & FSW Load Gen	Generate instrument loads from microprocessor
		Update load catalog w/ an entry for the uplink load
	ATC Load Gen & Validation	Generate ATC load from DAS
		Generate ground script
		Manage erroneous DAS input
	ATC Load Mgt	Create partitioned ATC load
		Manipulate the ATC buffer display
	Validate & Gen	Generate RTS load, image load file, & load report
	RTS Loads	Check for hard and soft constraints
	RTS Load Mgt	Modeling of RTS buffer for the 128 ground locations
		View all available RTS loads
		Store RTS loads in the load catalog
	Table Load Mgt	Modeling of table loads
		View all available table laods
		Store table loads in the load catalog
Command	Cmd Authorize	Support user request for command authority
		Deny command privilege to unauthorized users
	Cmd Generation	Encase packets in CLTU
		Monitor S/C CLCWs for command receipt verification
		Generate FARM control commands
		Apply pertinent gap between CLTUs
	Ground Script Control	Ground script control characteristics
		Display status of executing ground script

Table 3.3.1-1 General FOS Capabilities (3 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
	Ground Script Cmd	Process critical cmds, cmds w/ submnem, &
		prerequisite state check
		Manage override of crit. cmds & prereq state failures
	Manual Cmd	Process manually entered commands
		Validate submnem, hazardous, critical, & prereq state check commands
	Uplink Loads	Uplink RTS, table, instrument, & FSW loads
	Cmd Modes, Transmission	Select command rates
		Select active CTIU
		Transmit commands to S/C
		Enable retransmissions
	Tlm Verify & Cmd	Verify command receipt
	Uplink Verify	Provide status of each uplinked command
		Provide telemetry verification status
Telemetry	Decom - H & S, Standby	Decommutate and display H & S and Standby tlm
	Decom - H/K Tlm	Decommutate and display housekeeping telemetry
	EU Conversion	Conversion of raw telemetry to engineering units
	User Adjust of EU Conv	User modification of polynomial coefficients, selection of specific EU equation for limit check
	Multi-Byte Param Proc	Processing telemetry parameters that are non-contiguous in a packet
	Data Quality Determination	Determination of packet data quality
	Red/Yellow Limits	Deter if tlm valuesare w/in red/yellow limit range
		Check of multiple limit sets
		Display of limit set status
	Real-Time Data Dropout	Detection of telemetry data dropout
	Real-Time Tlm Archive	Archive R/T tlm for housekeeping, H & S, &
		standby on both I and Q channels
	Multiple Source	Concurrent flow of telemetry from both
	Tlm Receipt	I & Q channels

Table 3.3.1-1 General FOS Capabilities (4 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
	Tlm Replay Proc & Display	Dedicated replay of archive telemetry for housekeeping, H & S, and standby telemetry
Database	Dataset Generation	Generate datasets based on archived telemetry
		Display & print datasets
		Generate carryout files
Analysis	Anal Products	Generate dataset products based on tlm archive
	DB Crossover	data that covers the times of different DBs
	User Specified Statistics	Generate stats report based on user time/tlm
		parameters (manually selected mnemonics)
External	ASTER Sched &	Performe ASTER scheduling
	IST Access	Receipt, constraint check ASTER STS, ODS
		Integration of ASTER data into Master Plan
	FDF Interface	Ingest FDF products, validate, & populate into DB
		Process FDF products incl. table load, orb event gen
	NCC GCMR Processing	Send GCMRs to NCC
		Process GCM status & GCM disposition messages
	UPD Receipt & Archive	Send User Performance Data messages to NCC
		Receive, archive & dispaly UPD status from NCC
Operations	Hardware	Hardware components incl. servers &
		workstations, file servers, & peripherals
	Functional Report Analysis	Requirements that are operational or
		verified via design analysis
End-to-End	Decision Support	Monitor tlm quality via CODA, UPD, & housekeep tlm
		Detect & recognize ACE/SAD misconfig while in
		safe-hold and cmd decoder anomalies

Table 3.3.1-1 General FOS Capabilities (5 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
	ECT-2 Scenario	Schedule activities
		Build table, RTS, & ATC loads
		Uplink loads & procs, S/C dumps & compares
	S/C Activity Log	Receipt of S/C activity log entries in housekeep tlm
		Dump of S/C activity log table & log into archive
		History report of S/C activity data
	S/C State Check	Create command list for expected values of
		commands executed in back-orbit
		Compare & report actual S/C state check tlm
System	IST Functionality	Planning & Scheduling
		Load Management
		Real-time monitoring of telemetry and command
		Event reporting
		User interface tools
	Concurrent/Ops	Concurrent ops - sched, R/T, & off-line activities
		Computer performance analysis for all nodes,
		real-time telemetry and command rates
		Real-time telemetry & command monitoring
	Year 2000 Time Test	Ensure all FOS functionality handles year 2000 trans
	FOS Startup/Shutdown	Startup, shutdown procedures for FOS servers & workstations
	Logical String Config	Establish logical strings for ops, test, & train modes
		Create & disable mirrored and tailored logical strings
	Failure Recover & Monitor	Automated failover of logical strings for R/T server
		Ensure ground script operation is maintained during failover
		failover recovery
		Status monitoring of system resources
Events	Event Message Display	Generate and display events

Table 3.3.1-1 General FOS Capabilities (6 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
	Graph TL	Filter events multiple ways using selection filter
		Display scrolling events based on time range selected
		Indicators are color coded
	Event Message Filtering	Display global and local events
		Manipulate events via filtering options
	Event History Request & Reporting	Retrieve all requested events
		Specify start/stop times, event types, event id,
		S/C and instrument id
		Retrieve filtered events
		Store event history request for future use
	Alarm Message Handling	User alerted of alarm message with auditory signal
		& blinkong red message in control window
		Acknowledge messages that have a severity level
		of alarm by pressing the ACK button
Database	Dataset Generation, Reporting, Editing	Generate datasets based on archived telemetry
		Display & print datasets
		Generate carryout files
		Generate, view, & print entire or partial PDB,
		load catalog, and FDF reports using web pages
		Edit PDB definition files using the DB web pages
		Modify, add, or delete a command, telemetry, or
		an event definition
User Interface	Screen Management	ECL directive proc
		Window/room management
		3-line event
		Mouse control
		Command line editing
	User Custom	Color Schema
		Fonts for pages

Table 3.3.1-1 General FOS Capabilities (7 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
		Default directories
		Default printers
	Data Mover	Transfer files from local to system directories
		7 vice-versa
		Delete files from local storage areas
	Display (Alpha)	Create, save, modify, and delete display pages
		Add, modify, and delete items on display pages
		Display ground and telemetry parameters
	ECL Directives	Verify ECL directives for syntax
		Execute from Unix shell command
		Verify priviledges and execute w/in 0.5 sec
	Proc Builder	Create, update, and save procedures
		Verify proc constructs & ECL syntax
	Proc Control	Execution & control w/in the proc control window
	OASIS/CSTOL	Convert AM-1 CSTOL procedures to ECL syntax
		Provide details for conversion incompatibilities
	User Authen	Ensure valid user login
		Selection of user roles
		Add, modify, and delete users from the system
	Room Builder	Define, modify, save, & delete a room
		Add, delete, and resize windows in a room
		Allow a room to consist of 0 to 12 windows
	Display Graph	Create, save, modify, & customize graphs
		Display at least 6 mnemonics in graph
		Display at least 50 telemetry values in a table
	Display Schem	Build, save, and modify a schematic
		Display telemetry points & schematics (points lines, circles, etc)
		Two dimensional displays
	Doc Reader	Browse on-line documentation
		Search on-line documentation
		Manipulate hypertext documentation

Table 3.3.1-1 General FOS Capabilities (8 of 8)

SUBSYSTEM	FUNC / TOOL	CAPABILITY
	E-mail	Create, save, and delete e-mail messages
		Send e-mail messages - done through Netscape
	Quick Msg	Send messages to the event display
		Severity level incl. Info, Warning, Alarm, and Fatal
	OnLine Help	Functional descriptions of help for users
		via Netscape
		Info about any FOS window accessible from the
		Help button associated with the window or the
		Help button located on the environ control window

3.3.2 FOS Individual Test Results

This section defines the individual test status results for each test in the FOS Release B Test Suite, including infrastructure, subsystem, and end-to-end test. The following shows the order of test groups as presented in subsections below:

- Analysis Test Group
- Command Test Group
- Command Management Test Group
- System Test Group
- End-to-End Test Group
- Data Base Test Group
- User Interface Test Group
- Events Test Group
- Operations Test Group
- External Interface Test Group
- Planning and Scheduling Test Group
- Telemetry Test Group.

3.3.2.1 Analysis Test Group

This section presents the detailed result information for test ANA-2000B (Data Generation), ANA-2110 (User Generated Statistics), ANA-2090 (Analysis Products- Crossing Database Boundaries).

Test Case Number and Title: **ANA-2000B - Dataset Generation/General Analysis**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-003/411-CD-007-002)

Test Summary: This test is designed to verify the ability to build a telemetry history request via the combination of user interface and analysis tool options and automatically generate a dataset of matching archived telemetry data based on selected analysis options (i.e. telemetry parameter names, start/stop time intervals, sampling rates, etc.). The test begins with the initialization of the EOC. The Analysis Request tool is invoked and a historical request is generated, with selected options including request name, start/stop time interval, parameter names, and sampling rates. The requests are saved, and then submitted for dataset generation based on the menu options previously submitted. ASCII printouts are generated and analyzed post-test to ensure dataset accuracy and integrity. The next portion of the test deals with the selection of menu options causing error conditions (i.e. attempting to enter invalid sampling rates, modifying a previously saved request, etc.). Following the completion of each valid request, the request is submitted for dataset generation.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 25 August 1997; EOC - GSFC Building 32

Test Conduct Summary: All of the user interface menus supporting telemetry history included the proper fields (parameter name, data type, start/stop time intervals, and data quality information); It was determined, via post-test analysis, that the telemetry history reports generated match the users request and that the data was not compromised in any way through the retrieval and generation process; All illegal entries, with the exception of mnemonics, resulted in an error message and disallowed dataset generation; Illegal mnemonics were left out of the dataset generation. Six (6) NCRs were written during this test. They include: Unable to access all archived telemetry data for analysis; NCR ECSed08620 (F-ANA-01010), Carryout file does not match format; NCR ECSed08621 (F-ANA-04120), The status flag in the carryout file does not work; there is no invalid mnemonic indicator; NCR ECSed08621 & ECSed08504 (F-ANA-04130), Unable to process a

request at 12 times the realtime rate; NCR ECSed08642 (F-ANA-08070), Can only select start and stop times by calendar date and time; NCR ECSed08643, and There are no output views or output view formats; NCR ECSed08641 (F-FUI 09100).

Test Procedure Deviations: Four (4) deviations and one (1) workaround occurred during this test.

Step 85 was not performed. It is reflected elsewhere.

Step 132 the Hkreader utility was used to verify the correct time span had been selected to use in the analysis request. In an X-term window move to the tlmarchive directory: %:cd /fosb/test/am1/tlmarcive. List the files in the directory: %:ll.   Select a file to be read - AM1199723418HKI". In another X-term window move to the bin directory: %:cd bin List the files in the directory: %:ll Execute the Hkreader utility: %:Hkreader Follow the prompts in the utility - Enter the file into the reader using the full pathname: /fosb/test/am1/tlmarchive/AM1199723418HKI Select "no" at the prompt. The Hkreader utility returned a time for that file as 1997/234:18:04:22 - 1997/234:1809:11.

Step 132 and 133 were revised to reflect the correct date; 234.

Step 177 was referred back to step 156 to insert steps to reflect time selection.

A workaround using the FaDrReaderDriver was used to created the carryout file. In an X-term window move to the setup directory: %:cd /fosb/test/am1/scripts/setup Set the environment, %:setenv SCRIPT UserStation Source FosEnvVars, %:source FosEnvVars   Execute the utility, %:$BIN_DIR/FaDrReaderDriver   Follow the menu promts. Select (1) for telemetry, enter the dataset name, Myrequest1. Select (7) to generate a carryout file. Enter the name of the file, Myrequet1. Select (0) to quit the utiltiy.   Move to the data directory;   %:cd /fosb/test/am1/data Print the report, %:lp Myrequest1.out File names used were Myrequest1 and Modlocal.

Test Case Number and Title: **ANA-2090B - Crossing Database Boundaries.**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-003/411-CD-007-002)

Test Summary: This test is designed to verify the ability to build a telemetry history request which uses more than one operational database to build the dataset. The historical request is generated using selected analysis options (i.e. telemetry parameter names, start/stop time intervals, sampling rates, etc.) from a combination of user interface and analysis tool menus. The test begins with the initialization of the EOC to support off-line analysis processing. The Analysis Request Builder window is displayed, and a historical request is generated, with selected options including request name, start/stop time interval, parameter names, and sampling rates. The start/stop time interval selected spans two database IDs. The request is saved, and then submitted for dataset generation based on the menu options previously submitted. Following the generation of the dataset, a time order downlink report is generated and analyzed off-line to ensure that each portion of the dataset is based on the applicable database. The last portion of the test deals with the selection of menu options causing database crossover error conditions (mnemonics not matching one or more databases, etc.) and the ability to create and display a graph/view. Following the completion of each request, the request is submitted for dataset generation.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 26 August 1997; EOC - GSFC Building 32

Test Conduct Summary: User interface menus supporting telemetry history options included the proper fields (parameter names, data type, start/stop time intervals and data quality information. Via off-line analysis, it was determined that the telemetry history reports generated matched dataset content, dataset content was based on the applicable database, and the data integrity was not compromised during the generation of a dataset using multiple databases. Via off-line analysis, report printouts matched parameter values as specified in the dataset, before and after the crossover period. Report displays were unavailable. Illegal options or typos entered into the FUI windows disallowed dataset generation and resulted in

error messages. Nine (9) NCRs were written during this test. They include: Unable to override the automatice database selection - there is no place for the user to specify which pdb to use; NCR ECSed08517 (F-ANA-02050), There is no notification that telemetry mnemonics requested are not valid for the requested time interval; NCR ECSed08501 (F-ANA-03040), Reports and plots do not indicate that a requested parameter was not found for a requested time span; NCR ECSed08640 (F-ANA-03060), No messages are logged to the histort log indicating a specified mnemonic is no longer valid after a database crossover; NCR ECSed08502 (F-ANA-03150), No notification is provided if a specified mnemonic no longer has an EU conversion after a database crossover; NCR ECSed08503 (F-ANA-03170), There are no output views to save; NCR ECSed08507 (F-FUI-09215), There are no output views to modifiy; NCR ECSed08507 (F-FUI-09220), There is no way for the user to specify the version of the pdb to use; NCR ECSed08517 (F-RMS-00035), Time Order Downlink Report; NCR ECSed08556, Status word not working in the carryout file; NCR ECSed08618, and Error in dialog box; NCR ECSed08506.

Test Procedure Deviations: One (1) workaround occurred during this test.

A workaround using the FaDrReaderDriver was used to created the Time Order Downlink Report. In an X-term window move to the setup directory: %:cd /fosb/test/am1/scripts/setup Set the environment, %:setenv SCRIPT UserStation Source FosEnvVars, %:source FosEnvVars   Execute the utility, %:$BIN_DIR/FaDrReaderDriver Follow the menu promts. Select (1) for telemetry, enter the dataset name, Crossdb1. Select (6) to generate a Time Order Downlink Report. Enter the name of the report, Crossdb1. Select (0) to quit the utiltiy. Move to the reports directory; %:cd /fosb/test/am1/reports Print the report, %:lp Crossdb1.report.

Test Case Number and Title: **ANA-2110B - User Specified Statistics**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-003/411-CD-007-002)

Test Summary: This test is designed to verify the ability to build a user-specified statistics request via the combination of user interface and analysis tool options and automatically generate a dataset of matching statistics based on archived telemetry data associated with the user request. The test begins with the initialization of the EOC. The Analysis Request Builder tool is invoked and a user-specified statistics request is generated, with selected options including request name, parameter names, start/stop time, and statistics interval times. The request is saved, and then submitted for dataset generation based on the menu options previously submitted. Reports are generated, printed and analyzed post-test to ensure dataset accuracy and integrity. Following the completion of each request, the request is submitted for dataset generation.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 25 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The user request matched the associated dataset content; Statistic computation was accurate and based on the start/stop time interval supplied by the user; The number of samples listed for each statistical computation matched the number of samples available in the selected start/stop time; The user was provided with the capability to generate an ASCII report from a user-specified statistics request; The statistics report contained header information consisting of a date and time of the report, a spacecraft start and stop time, and an interval type for the statistic; For each parameter, the statistics report contained a mnemonic name, minimum value, maximum value, mean value, standard deviation, number of samples, and spacecraft time for the minimum and maximum values; Data archive integrity was compromised during dataset generation. Six (6) NCRs were written during this test. They include: There is no user notification if mnemonics requested are found to be invalid for a specified mission; NCR ECSed08555 (F-ANA-03030), Unable to compute statistics for a user defined interval of greater than one second and less than or equal than one day; NCR ECSed08554 (F-ANA-05220), There is no way to retrieve archived telemetry by specifying data type; NCR ECSed08639 (F-DMS-00770), The initialization of off-line telemetry from the EOC

archive takes longer than 5 seconds after receipt of request; NCR ECSed08638 (F-DMS-00790), The EOC shall be capable of retrieving files; NCR ECSed08637 (F-DMS-01020), and Unable to create User Stats report using FUI interface; NCR ECSed08624.

Test Procedure Deviations: Three (3) deviations and two (2) workarounds occurred during this test.

Step 60 & 61 the request start/stop times were verified using the Control Window Events monitor. The Events Display Local was not updating.

Steps 122 - 126 were skipped due to operator error. No inpact to the test was caused.

Step 127 the request start and stop completion was verified using the Control Window Events monitor. The Events Display Local was not updating.

A workaround using the FaDrReaderDriver was used to created the User Statistics Report. In an X-term window move to the setup directory: %:cd /fosb/test/am1/scripts/setup Set the environment, %:setenv SCRIPT UserStation Source FosEnvVars, %:source FosEnvVars   Execute the utility, %:$BIN_DIR/FaDrReaderDriver Follow the menu promts. Select (2) for User Stats, enter the dataset name, Myrequest2. Select (6) to generate a User Specified Statistics Report. Enter the name of the report, Myrequest2. Select (0) to quit the utiltiy. Move to the reports directory; %:cd /fosb/test/am1/reports Print the report, %:lp Myrequest2.report.

A workaround using the FaDrReaderDriver was used to created the Time Order Downlink Report. In an X-term window move to the setup directory: %:cd /fosb/test/am1/scripts/setup Set the environment, %:setenv SCRIPT UserStation Source FosEnvVars, %:source FosEnvVars   Execute the utility, %:$BIN_DIR/FaDrReaderDriver Follow the menu promts. Select (1) for telemetry, enter the dataset name, Myrequest3. Select (6) to generate a Time Order Downlink Report. Enter the name of the report, Myrequest3. Select (0) to quit the utiltiy. Move to the reports directory; %:cd /fosb/test/am1/reports Print the report, %:lp Myrequest3.report.

3.3.2.2 Command Test Group

This section presents the detailed result information for test CMD-2000B (Command Authorization), CMD-2001B (Command Generation), CMD-2010 (Ground Script Control), CMD-2015B (Ground Script Commanding), CMD-2030B (Manual Commanding), CMD-2050B (Uplink Loads), CMD-2070B (Command Modes, Transmission, and Uplink), and CMD-2080B (Command TLM Verification and Receipt Verification).

Test Case Number and Title:	**CMD-2000B - Command Authorization**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to support a user request for command authorization. This test demonstrates that a user is able to input the necessary ECL directives to request Command Activity Controller (CAC) privileges at the user's workstation, and that the FOS rejects any request for command authority made by a user that does not have appropriate privileges. The secondary objective of this test is to verify the FOS capability to support FUI processing of command directives that are entered manually in real time at the CAC user workstation and performs a syntax check.
Pass/Fail Assessment:	PASS
Date of Test:	01 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to support a user request for command authorization. We were able to input the necessary ECL directives to request Command Activity Controller (CAC) privileges at the user's workstation. FOS rejected all requests for command authority made by a user that did not have appropriate privileges. Also verified that FOS supports FUI processing of command directives that are entered manually in real time at the CAC user workstation and performs a syntax check.
Test Procedure Deviations:	The Data Server and the Real Time Server were already up from the previous test. The Real Time Server was in a corrupted state so it was recycled. The culmination of this was that Steps 1 and 2 were not applicable for this test.
	Step 4 was redlined to add "Select 'OK' " following the selection of Event_Display-Global.

Step 7 was redlined to add "for string 100" to the second event message.

Step 9 was redlined to change column heading 'BUFFER' to 'ATC_LOC'. This column heading will be changed in all appearances in the test procedure.

Steps 19 through 21 were executed after step 14 and then steps 15 through 18 were executed followed by step 22. Steps 19 through 21 only log a user onto a userstation and connects to string 100. This did not affect the test validity or integrity.

Step 20 was redlined to bold 'Event_Display-Global' and add "Click on 'OK'".

Step 22 was redlined to delete the event message 'Command Authority starting <userstation_id> for string 100.

Step 27 Action text goes with Step 28 Results and the Step 28 action text is deleted.

Step 31- Only three workstations were available for test, so we had to log off of the third workstation used to perform this step. Did not affect the validity or integrity of the test.

Step 32 was redlined to bold 'Event_Display-Global' and add "Click on 'OK'.

Step 35 was redlined to click on the 'Close' button on the Command Monitor window and select Quit.

Step 37 was redlined to add the wording of Step

Test Case Number and Title:	**CMD-2001B - Command Generation**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test will verify the following functions of the command generation based on the ICD-106 Format; the Ground message header and Transfer Frame, encase packets within a command link transmission unit. Monitor command link control words (CLCWs) from the spacecraft to ascertain status of the command link. Support the generation of FARM control commands and AD commands. Append the necessary acquisition sequence to the CLTU(s) prior to transmission to EDOS.

Append the necessary gap to the CLTU prior to transmission to EDOS.

Pass/Fail Assessment: PASS

Date of Test: 13 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the FOS capability to successfully build and format FARM control commands and AD according to ICD-106. Also, demonstrated FOS can correctly process raw hex commands.

Test Procedure Deviations: Step 11 had to manually initialize Command Control Window (CCW).

Step 13 redlined procedure to reflect correct directory path /fosb/test/am1/bin/sun_sparc_5-5.

Test Case Number and Title: **CMD-2010B - Ground Control & Manipulation**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test demonstrates that a user with CAC privileges is provided the tools necessary to initiate the execution of a ground script, derived from a Detailed Activity Schedule (DAS), and manipulate ground script execution. Manipulation of this ground script includes; enable/disable of individual directives, transferring the execution to a directive, suspend, resume and termination of the currently executing ground script. Executing ground script in confirmation mode (Step mode) and Auto mode. The user will have the ability to search for a specified text string, command or procedure. In addition, this test will verify the displays provided to the users for validating proper execution of ground script directives. Prior to executing the ground script the user can view the contents of the ground script from the Ground Script Display window.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 20 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The ground script was viewed from the Ground Script Display window prior to execution. Successful demonstration of CAC capabilities to select a valid ground script, initiate execution of the ground script, manipulate ground script control and terminate the

ground script via user directives. The procedure contained in ground script expands and executes. The user could specify a find criteria based on a text string, command or procedure and the system will search the ground script. The ground script processed command directives for the spacecraft. When the ground script was placed in confirmation mode (step mode) the user was prompted for each directive and had the option to cancel or confirm pending commands. NCRs written include 04231, 08474.

Test Procedure Deviations:	Step 22 ground script starting executing without user initiation. Killed ground script and repeated steps 18-22. Inserted WAIT ECL directives. Directives were overwritten.
	Intermittent problems with the Ground Script Controller resurfaced. The Command Control Window hung, had to reinitialize. Several steps had to be repeated because of these problems.
Test Case Number and Title:	**CMD-2015B - Ground Script Commanding**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test demonstrates that a user with CAC privileges is provided the tools necessary to initiate the execution of a ground script, derived from a Detailed Activity Schedule (DAS). This test is designed to verify the FOS capability to process safety, critical, submnemonics, and prerequisite state checks for commands that are contained as part of a ground script. When that ground script is executing the user can override or cancel PSC and critical commands directives. The test data will consist of a DAS consisting of all command types listed above. This test also, demonstrates that for commands issued as part of a ground script, the FOS is capable of recognizing and executing valid command definitions based on the FOS PDB files. In addition, the transfer frame header information and application data should be formatted according to the CCSDS document and verified during post test analysis.
Pass/Fail Assessment:	PASS
Date of Test:	18 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The authorized user should be to override or cancel critical commands or when prerequisite state check fails using the FUI interface options provided by the Command Control window (CCW). The submnemonic command definitions that are invalid should be rejected, based on the definition in the command PDB, however the default value is assigned when the value is not specified. The user received status of the command directives in the CCW. All commands are validated according to the FOS command PDB definitions. Confirmed the transfer frame header information and application data are formatted according to the CCSDS document and verified during post test analysis. Two NCRs were written NCR 08356 and NCR 08486.

Test Procedure Deviations: Repeated steps 10 & 11 due to operator error.

Had to manually initialize CCW

ECL directives for ground script were overwritten.

Could not override/cancel out of range submnemonics.

Test Case Number and Title: **CMD-2030B - Manual Commanding**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the FOS has the capability to support the processing of command directives that are entered manually via the command input line in the Command Control Window (CCW) at a CAC user workstation during real-time. This test demonstrates that FOS is capable of recognizing regular safety commands, commands with valid and invalid submnemonics, hazardous, critical, commands, and prerequisite state check commands. A display page (entitled 'prereq') with PSC commands has been created to monitor the telemetry mnemonics associated with prerequisite state check commands. In addition, the transfer frame header information and application data should be formatted according to the CCSDS document and verified during post test analysis.

Pass/Fail Assessment: PARTIAL/PASS

Date of Test: 14 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The authorized user should be to override or cancel
                                       critical commands or when prerequisite state check fails
                                       using the FUI interface options provided by the
                                       Command Control window (CCW). NCRs were written
                                       for hazardous commands were defined in the PDB that
                                       were rejected by the parser. Also, could not verify the
                                       PSC for a command mnemonic mapped to more than one
                                       telemetry mnemonic. The submnemonic command
                                       definitions that are invalid should be rejected, based on
                                       the definition in the command PDB, however the default
                                       value is assigned when the value is not specified. The
                                       user received status of the command directives in the
                                       CCW. All commands are validated according to the FOS
                                       command PDB definitions. Confirmed the transfer frame
                                       header information and application data are formatted
                                       according to the CCSDS document and verified during
                                       post test analysis. NCR written 4741, 08687, 08688,
                                       08691.

Test Procedure Deviations: Intermittent problems with the Ground Script Controller
                                       resurfaced. The Command Control Window hung, had to
                                       reinitialize the real-time server, and repeat steps 4-9.

Test Case Number and Title: **CMD-2050B - Uplink Loads**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-
                                       007-002/411-CD-007-002)

Test Summary: This test is designed to verify the FOS has the capability
                                       to support the capability of FOS to uplink a variety of
                                       loads manually and via ground script; assume all loads
                                       are generated and are ready for uplink. Secondly FOS
                                       shall provide the capability to view via telemetry the
                                       successful dispatch of absolute time stored commands
                                       and relative time stored commands.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 19 August 1997; EOC - GSFC Building 32

Test Conduct Summary: Demonstration that the FOS provides the user with a
                                       capability to uplink a variety of loads such as: RTS Load,
                                       Table Load, instrument and FSW load manually using
                                       LOAD directive. Could verify load was uplinked via
                                       telemetry because the load initiate commands used did
                                       not have cev mnemonics with high low values. Did not

uplink an ATC or a critical load during AT, however successfully demonstrated during retest. NCRs written: 08544, 08019.

Test Procedure Deviations: Prior to uplinking the loads turned telemetry verification TV) and Command Verification (CV) off.

Test Case Number and Title: **CMD-2070B - Command Modes Transmission and Uplink**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test will verify the following functions of the Command modes - Transmission & Uplink:

    1. Select Rate.
    2. Transmit Commands to the EOS spacecraft.
    3. Utilize a single virtual channel for uplink.
    4. Select CTIU.

Also this test will provide the automatic retransmission of CLTU's once it has been determined that commands have been

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 19 August 1997; EOC - GSFC Building 32

Test Conduct Summary: Demonstrated that the FOS provides the user with a capability to select an uplink rate choose an active CTIU, and to transmit commands to the EOS spacecraft. Configured ground for PLOP2 and specified CLTU quantity, uplinked a load, and confirmed the command data block was formatted correctly. Demonstrated the capability to retransmit of the commands that may have been lost during the transmission and uplink. Wrote an NCR FOP TRANSMIT directive does not work correctly for values 5 and 3 (NCR # 08685). Reinitialized FOP prior to each ground configuration.

Test Procedure Deviations: Experienced problems with CCW hanging up several times during the test, reinitialize CCW. Had to reinitialize FOP by stopping sc, setting timer to 1 and sending a no op command.

Test Case Number and Title: **CMD-2080B - Command Telemetry and Command Verification**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the FOS capability to support the verification of commands. Commands are verified in two ways: Command Receipt Verification and Telemetry Verification. Command Receipt Verification verifies that uplinked commands were received intact on board the spacecraft. Telemetry verification verifies that the commands were successfully executed. This is accomplished by checking real time telemetry after allowing sufficient time for the command to execute, and the telemetry to downlink. (The pre-determined time is defined from command database, and is based upon onboard execution time)

Pass/Fail Assessment: PASS

Date of Test: 18 August 1997; EOC - GSFC Building 32

Test Conduct Summary: Demonstration FOS provides the user with a capability to verify the successful receipt of real time commands and, provides the user with the status of each command uplinked as a success or fail, also demonstrated FOS will provide the user with a capability to provide the user the spacecraft and instrument command telemetry verification status. Created a display page to view cev mnemonics.

Test Procedure Deviations: Experienced problems with CCW hanging up, had to reinitialize.

3.3.2.3 Command Management Test Group

This section presents the detailed result information for test CMS-2000B (Memory Dump Image), CMS-2040B (Table Load Validation and Generation), CMS-2060B (Microprocessor & FSW Load Generation), CMS-2090B (ATC Load Generation & Validation), CMS-2100B ATC Load Management, CMS-2170B (Validat and Generate RTS Load Contents), CMS-2180B (Table Load Management), and CMS-2190 (Table Load Management)

Test Case Number and Title: **CMS-2000B - Memory Dump Image**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify FOS has the capability to support that a user can successfully dump and store it in a file, in an area of memory on the spacecraft, and ensures a dump compare can be successfully performed. This test will also ensures a user can overwrite the current values of the ground reference image with the contents of a dump from the spacecraft. The Command Management

Subsystem (CMS) will generate a report on the contents of a dump file, the ground image, load image or dump image.

Using the FUI tools and ECL directives the user can convert a table dump file to a table load contents file. The table load contents file will then be ingested into the FUI table load builder, the user can perform a table dump, a file will be created, this file can be compared with the default values in the data base for that table.

Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	19 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	Used ETS to collect dumps at 1k and 16k. Demonstrated FOS provides the user the capability to generate a dump and store it in a file in an area of memory. Issued ECL directives to generate comparison reports. Was able to successfully compare a dump file to an image file, image file to image file, a dump to a dump, however could not compare any type of file to the ground reference image. Through the use of ECL directives was able to perform an image overwrite of the ground reference system, and create an image report. Was unable to demonstrate reverse engineering of the table load contents. Was able to create a memory mask however the result was the reverse of expected results. NCRs written 08374, 08542,08543, 08496, 08495, 08515, 08737, 08738.
Test Procedure Deviations:	Steps 16 & 19 were done previously with ETS to collect test data.
	Could not complete steps 34-35, reverse engineering of a table load.
Test Case Number and Title:	**CMS-2040B - Table Load Validation & Generation**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify an authorized user's generation of a Table Load content file using the load builder tools available through FUI. In addition, the authorized user is provided a pre-defined table template with default parameter values defined in the Project Data Base that can be modified accordingly. This test demonstrates that the user is provided with the tools necessary to invoke the load builder to input, validate,

and generate a table load. Once generation is complete this test will verify that CMS has stored the uplink load file, load image file, a load report, load contents file, and a load catalog entry in the FOS Database. The user will also have the capability to open and delete a table load from load catalog, open a table dump from load catalog, generate a load with the table load initiate command.

Pass/Fail Assessment: PASS

Date of Test: 30 July1997; EOC - GSFC Building 32

Test Conduct Summary   This test successfully verified that a user is able to select a Table Template, modify the contents and create a Table Load. Loads were also created from ingesting a table load content file. The load contents files were validated against the Table buffer characteristics defined in the Project Data Base as required. An uplink load, image load, load contents file, load catalog entry and a load report associated with each table load is generated as expected. The user is properly notified when an invalid load contents file is detected during the validation process. Binary conversion of table load contents conform to Mil STD 175. All requirements were met for this test case.

Test Procedure Deviations: No Deviations.

Test Case Number and Title: **CMS-2060 - Microprocessor & FSW LoadGeneration**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that the FOS has the capability to support EOC in generating instrument loads from microprocessor and flight software load content files. The FUI Binary Load Builder window is initialized to invoke the ingest process and select the load contents file. Once load validation and load generation is completed, a request to CMS is initiated to complete the uplink process. The final steps of the test verify that the load catalog is updated with an entry for the uplink load generated. The scheduling of uplinking of loads will be demonstrated in Test Case CMD 2050.

Pass/Fail Assessment: PASS

Date of Test: 04 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified that a user is able to ingest the instrument and flight software load contents file into the EOC. Following successful ingest, the load contents file was validated and used by CMS to generate instrument & flight software uplink loads. The CMS generation of the uplink load was invoked once a successful request from FUI Binary Load Builder was performed. Load reports and load image files were generated through the CMS and the load catalog was updated with entries for the uplinked load. Instrument loads for MODIS and MOPITT microprocessor and flight software were unsuccessfully generated. All other requirements were satisfied for this test case.

Test Procedure Deviations: Step 10 was updated to include the ingesting of all files.

Step 14 was updated to reflect clicking the "Okay" button.

Step 19 was repeated due to a failure message occurring. This was a result of dry runs performed and the inability of the software to re-ingest the same files.

Step 21b was exchanged with step 21d.

Steps 31 - 35, 37 - 40 and 53-62 were unable to be completed due to the MODIS & MOPITT NCR's.

Test Case Number and Title: **CMS 2090B - ATC Load Generation & Validation**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test verifies that the CMS is capable of supporting the generation of an ATC load from a DAS received from Planning & Scheduling (PAS). This test also verifies the CMS' capability to support the generation of a ground script over the same time period as the ATC, upon receipt of a valid request from the User Interface. A DAS which includes activities and commands scheduled against the master plan is created. Once the DAS is created, a request is sent to the CMS Schedule Controller process for expansion of the DAS and generation of the ATC load. Upon completion of the ATC load, the PAS receives a completion status from CMS. Analysis to ensure the build and storage of the load, creation of the load report, integrated report and the update of the load catalog is required. Once an ATC load is generated,

CMS' capability to support a FUI request for ground script generation is verified. A request will be sent to CMS for ground script generation over the same time period as the DAS. Contents of the ground script against the DAS and ATC load are verified through analysis. Finally, CMS' capability to support the handling of an erroneous DAS sent from PAS is verified. This includes error status notification to the user as opposed to processing the DAS.

Pass/Fail Assessment: PASS

Date of Test: 14 August 1997; EOC - GSFC Building 32 &

26 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the capability to generate ATC loads with soft constraints and the capability to prohibit hard constraints as well as the ability of an user to select a portion of the PAS timeline master plan and generate a DAS. This test verified a DAS was sent successfully to the CMS Schedule Controller process for expansion and ATC load generation. ATC load generation consisted of the generation of the binary load, load report, integrated report and an update to the load catalog. Upon completion of the ATC load generation, CMS returned a completion status to the PAS load generator process. In addition, FUI automatically requested CMS to generate a ground schedule that corresponded to the start and stop time of the DAS used for ATC load generation. Erroneous DASs were recognized and the appropriate error message was sent to the user while the DAS is unsuccessfully processed. This portion of the test was run on August 14, 1997. The generation of Partial ATC Loads was successfully verified during the August 26, 1997 test.

Once a hard constraint is encountered, any remaining activities scheduled (without hard constraints) fail due to previous activities. The first command of the appended command list is added to the end of the activities as requird; however, the remaining commands are not. The remaining requirements were met in full or partially.

Test Procedure Deviations: Step 9 was re-done to open the EOS Timeline for a greater period of time.

Steps 53 - 66 were not performed on August 14, 1997; however, they were completed on August 26, 1997.

Test Case Number and Title: **CMS-2100B - ATC Load Management**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that full and partitioned ATC loads are created and located in the buffer areas specified according to the ATC load report. The ATC buffer is displayed to show the available locations and information contained in each. The Buffer and Modeling Reports created after notification of ATC load uplinks are verified for accuracy. This information is verified against the ATC Load Report as well.

Pass/Fail Assessment: PASS

Date of Test: 28 August 1997; EOC - GSFC Building 32

Test Conduct Summary This test successfully demonstrated the ability to generate and verify the reports created. Partitioned ATC loads were created and the ATC buffer display was manipulated according to the criteria specified. When uplinking an ATC load, the ATC Buffer display was terminated and re-initialized several times since the buffers did not contain the updated information (NCR generated). In addition, the Load Command isnot displayed in the ATC Buffer Display. The ATC Buffer Display did not accurately reflect an uplinked partitioned ATC load. Finally, the Report Generator which was used to create the reports had to be terminated and re-initialized frequently since it did not update and create a report each time. The remaining requirements were met in full or partially. NCRS written 08663, 08667, 08665, 08668.

Test Procedure Deviations: Step 5 was repeated since previous partitioned loads had to be uplinked before a new one.

It was not necessary to perform Step 17, the reports contained the information needed.

Step 18 was repeated since the Report was not updated the first time.

The reports created in Steps 15, 18 & 21 were not in the Reports Directory as required, but they were in the "...cms/FmMm Directory".

Test Case Number and Title:	**CMS-2170B - RTS Load Validation & Generation**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the capability to support the generation of a RTS load content file using the FUI RTS Load Builder Tool. This test demonstrates that an authorized user can create a RTS load and invoke the FUI upon completion. The CMS subsystem generates a RTS load contents file, an uplink load file, an image load file and a report associated with that load. In addition, this test will verify CMS can store the uplink and load images files and send them to DMS to be saved as a load catalog entry. The CMS will execute the validation process prior to generation. Due to hard and soft constraint violations defined in the FOS database, a RTS load containing soft constraints will prompt the user to generate the load and override the soft constraint. However, if the load contains a hard constraint the user will be notified and the load will not be generated. The user will also have the capability to open or delete a RTS load based on the Load Catalog entry and define up to sixteen command mnemonics (i.e. critical, submnemonic).
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	06 August 1997; EOC - GSFC Building 32
Test Conduct Summary	This test successfully demonstrated that FOS provides the user the capability to generate RTS load contents using the RTS Load Builder. Upon load generation the Meta Data server placed an uplink, an image, and a report file (stored by CMS) in the appropriate CMS loads and reports directories. It also demonstrates that CMS is able to update the load catalog entry and send it to DMS. The capability to provide notification when a load contained a hard or soft constraint failed verification; therefore, the ability to allow the override or rejection of any constraints was not satisified. Opening or deleting a load from a load catalog entry was verified as well as the limitation of defining up to sixteen command mnemonics.

The remaining requirements were verified in full or partially. NCRs written 08330, 08358.

Test Procedure Deviations: Step 4 was updated to reflect clicking the "Okay" button.

Step 12 was updated to include "Click No, if applicable".

Steps 29 - 34 were not executed due to the NCR against the inability to verify the soft and hard constraint requirements.

Step 46 was updated to change "Delete" to "Open" in the Expect Result/Comment column.

Test Case Number and Title: **CMS-2180B - RTS Load Management**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that the RTS buffer in load management are being properly modeled. Load management should maintain a RTS buffer model that mirrors what is on the spacecraft for each of the 128 buffer locations. This test demonstrates that when the user uplinks a RTS load, CMS updates its buffer model. Once the load is uplinked and the buffer model is updated, the user can request a map report which is a summary report of all of the buffers, or the user can request a report on one specific RTS buffer. This test will also demonstrate the ability to view all available RTS loads that have been generated and that are stored in the DMS load catalog. The validation and generation of the RTS load is covered in Test Case CMS-2170B

Pass/Fail Assessment: PASS

Date of Test: 26 August 1997; EOC - GSFC Building 32

Test Conduct Summary: Generated both RTS buffer model reports, and load catalog reports, ensured the information contained in the report is correct. Demonstrated the CMS buffer model is updated with the contents of the newly uplinked load through the use of the Manual Uplink Notification directive. Initially was not able to view Map report, however was able to successfully view the report during regression tests. NCRs written 08749, 08576.

Test Procedure Deviations:	The RTS Buffer Report were not written to the reports directory. Had to go to the following directory

     cd /fosb/test/am1/cms/FmMm

The Buffer Display did not refresh when the buffer model was updated. If the user quit the tool and reinitiated the tool the updated information appeared in the appropriate buffer.

Test Case Number and Title:	**CMS-2190B - Table Load Management**

Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:	This test is designed to verify that the Table buffers in load management are being properly modeled. Load management maintains a Table buffer model that mirrors what is on the spacecraft. This test demonstrates that when the user uplinks a Table load, CMS updates its buffer model. Once the load is uplinked and the buffer model is updated, the user can request a map report which is a summary report of all of the table buffers, or the user can request a report on one specific Table buffer. This test will also demonstrate the ability to view all available Table loads that have been generated and that are stored in the DMS load catalog. The validation and generation of the Table load is covered in Test Case CMS-2040B.

Pass/Fail Assessment:	PASS

Date of Test:	26 August 1997; EOC - GSFC Building 32

Test Conduct Summary	This test successfully verified that a user is able to generate both Table Buffer and Model reports as well as ensure the information contained in the report is correct. In addition, a user can generate a report on the available Table Load uplinked via the Load Catalog. After a load is uplinked, the CMS Buffer Model is updated with the contents of the newly uplinked load. The reports were verified for accuracy and compared to the corresponding Table Load Report generated at the time a load is created. Although the reports were created through the Report Generator Tool, the tool had to be re-initialized to reflect updates. The reports were created in the ".../cms/FmMm" directory instead of the reports directory as required. Inconsistencies was detected between the Load Report and the Buffer Model Map Report for partial loads. The remaining requirements were met in full. NCR 08613.

Test Procedure Deviations: The report information in Step 34 was located in the ".../cms/FmMm" and not the reports directory as expected.

3.3.2.4 System Test Group

This section presents the detailed result information for test SYS-2000B (FOS Server and User Station Startup and Shutdown), SYS-2020B(Logical String Configuration, Control and Termination), and SYS-2030B (Failure Recovery and Status Monitoring).

Test Case Number and Title: **SYS-2000B - FOS Server and User Station Startup and Shutdown**

Reference to Test Documentation: FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that the EOC Data Server, Real-Time Server, and user stations can be properly initialized, and brought up to an operational state, and brought down in an orderly manner. Following UNIX login to two EOC user stations, the user remotely logs in to the Data Server and checks that the Sybase Server has been initialized. The user then invokes the Data Server startup script. Following completion of Data Server initialization, the user brings up a User Station via the FOS Login screen. Following completion of User Station initialization, the user brings up the Event Display. The user then invokes the startup script for the Real-Time Server. Following completion of the Real-Time Server initialization, the user shuts down the Real-Time Server, User Station, and Data Server by invoking shutdown scripts. The UNIX 'kill' command is used, as necessary, to terminate any remaining processes. All endpoints are removed. The user closes all windows and terminates the session on each user station.

Pass/Fail Assessment: PASS

Date of Test: 22 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified that only a valid user can log in to the EOC Data Server, Real Time Server, and user station. The Data Server and Real-Time Server initialization was successful, although there was a failure when initializing the Communications Contact Scheduler process as part of EOC user station startup (NCR 08622). The Data Server was brought up within 5 minutes. The EOC user station, Real-Time Server, and Data Server

were shut down such that there were no endpoints or FOS processes remaining. However, many processes were not automatically terminated by the 'MyKill' script, thus the need to manually kill each outstanding process, including the 50 'FoRf Reflector_service' processes remaining on the Data Server (NCR 08257).

Test Procedure Deviations: Added Password field to Step 4.

In Step 9, the correct number of endpoints is 81 for the Data Server and 131 for the system.

In Step 13, added '&' to the 'FOS_LOGIN' script.

In Step 15, selected 'Operations Controller' user role, not 'Command Activity Controller'.

In Step 16, changed the directory to '/fosb/test/am1/scripts/setup'.

Test Case Number and Title: **SYS-2020B - Logical String Configuration, Control, and Termination**

Reference to Test Documentation: FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the ability to configure the FOS resources in support of operational, test, and training activities. Following initialization of the FOS Servers and User Stations, logical strings are created for various combinations of data source (real-time or simulated) and mode (operational, test, or training). Several iterations of connecting to, disconnecting from, and deleting logical strings are performed. Telemetry processing and command generation is executed for each logical string mode. Telemetry decommutation is turned off, and later turned on, for a tailored string connection. Alphanumeric display pages containing logical string information are viewed for each logical string. Attempts to create existing strings, connect to non-existent strings, and delete connected strings are exercised.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 14 August 1997 (Ops LAN) and 15 August 1997 (Support LAN); EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified that initialization of real-time processes invoke the Real-Time server default

logical string resources. Additional logical strings were created for valid combinations of data source and mode, i.e., real-time/operational, real-time/test, simulation/training, and simulation/test. However, the system was extremely slow when trying to create a Simulation/Training string (NCR 08494). Logical strings were created while a real-time logical string was already in existence. Logical strings were successfully deleted, except in one instance where the directive was entered twice to delete the string (NCR 08050). Only the Ground Controller for a given logical string could delete that string, but an event message associated with taking ground control indicated an incorrect string identifier (NCR 08041). Logical strings were successfully connected to, and disconnected from, via ECL directive. Attempts to create existing strings, connect to non-existent strings, and delete connected strings were correctly denied.

Although no 'status' display page came up automatically (NCR 08509), a pre-built logical string display page was brought up containing similar 'SYS' parameter mnemonics. However, the 'SYS' parameter values were not updating during the test (NCR 07781). Also, the 'S' (static) flag is displayed for 'SYS' parameters even after parameter values are updated (NCR 07608). Mirrored string connections resulted in successful decommutation and display of housekeeping telemetry parameter values. A user station that was connected to a string as 'tailored' was correctly the only user station affected by turning off telemetry decommutation, but turning the telemetry decommutation back on had no effect (NCR 08493). Commands were generated for each logical string, although an incorrect error message appeared when leaving the Spacecraft Id field blank in the CCW/CMW dialog window (NCR 08088).

Test Procedure Deviations: Step 6 applies to User Station #1 only.

In Steps 6, 11, 12, and 46 used workaround which brought up the 'Logical String' display page, since the 'status' display page didn't come up automatically.

In Step 11, changed all occurrences of '101' to '100'. Moved Step 11 to follow Step 6 and deleted Step 11.

In Steps 9 and 15, manipulated the 'Data Source Selector' on the Logical String display page so the 'SYS' parameter values would update.

In Steps 21 and 22, changed all occurrences of '101' in the 'Action' column to '100'.

In Steps 35 and 54, used 'FOP INIT NOCHECK' to work around the 'sc' tool limitation ('sc' tool doesn't seem to work correctly with strings other than Real-Time/Operational).

When executing Step 45 on 14 August (on Ops LAN), the system was extremely slow; so this step and the rest of the test were resumed on 15 August (on Support LAN). Several of the earlier steps needed to be re-executed on 15 August to bring the test to the same configuration that it was in when we stopped the test on 14 August.

In Steps 51 and 54, used port numbers '20170' and '20198', respectively, to accommodate test execution on the Support LAN on 15 August.

Moved Step 70 to follow Step 61 and deleted Step 70.

Test Case Number and Title:	**SYS-2030B - Failure Recovery and Status Monitoring**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify that the EOC has no single point of failure for functions associated with real-time operations, can quickly and properly recover from unscheduled software and hardware failures (including those associated with user stations, Real-Time Server, Data Server, File Server, and Network (ECS Router and LAN)), and provides status monitoring information on FOS resources. The FOS Servers, and EOC user stations are initialized, including connection to default string 100. EOC user station failures are induced, resulting in event messages, re-initialization, and switching command authority. Unsuccessful attempts are made to create a backup server for String 100 because either the user does not have Ground Control Authority or the active server is specified as the backup. After taking Ground Control and specifying the proper server, a backup server is successfully created for String 100. Server identification and other system parameters are inspected on a pre-built

display page for the proper values. The flow of telemetry is initiated and monitored via pre-built display pages.

A software failure of several key processes is induced on the Real-Time Server, resulting in Ground Script suspension and event messages. An ECL directive is used to initiate a failover from the active to the backup Real-Time Server. Event messages and display pages are inspected for messages on server status and updated ground system information, respectively. The Ground Script is resumed on the new, active Real-Time Server, and the Event Display is checked for associated messages. UNIX commands and Netscape are used to check access to data (files) and the data base.

The user specifies the former active Real-Time Server as the backup server. A hardware failure is induced on the current active Real-Time server, and an event message is generated. The same failover and post-failover check-out steps are executed as previously, i.e., resume executing the Ground Script, inspect display pages, and access files and the data base. Next, a major software failure is induced on the Data Server, but since there is no automated failover processing, the inactive Data Server is initialized using standard Data Server startup procedures. The same post-failure check-out steps are executed as previously. A hardware failure is induced on the Data Server, followed by initialization of the inactive Data Server and post-failure check-out as previously. Then a hardware failure is induced on the File Server, but since there is permanent redundancy, the failover is automatic. The same post-failure check-out steps are executed as previously. Next, the Primary EOC Router is powered off, and a script is executed to switch all applicable hardware to the Secondary EOC Router. The same post-failure check-out steps are executed as previously. Finally a failure is induced on the Operational LAN by powering down the applicable FDDI concentrators and Ethernet switches. A script is executed to switch all applicable hardware to the Support LAN. The same post-failure check-out steps are executed as previously.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 23-24 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified that the EOC has the capability to failover the Real-Time Server within one minute as a result of software failure of a real-time logical string component. Real-time telemetry processing and data base access was verified before and after failover. Additionally, a ground script that was partially executed prior to failover resumed where it left off after the failover, although the Command Control Window didn't always initialize properly on the user station. A backup logical string using the formerly active (and currently inactive) Real-Time Server as the backup server could not be created. Failover did not occur for a Real-Time Server hardware failure (NCR 08628). When a user station with Command or Ground Control Authority changed its status (went down or came back up), an event message was generated. However, for changes in status of the Data Server and those user stations without Command or Ground Control Authority, no messages were generated (NCR 07775). (Tivoli is needed to provide these notifications, but Tivoli was not yet installed (NCR 07606).) A pre-built alphanumeric display page was updated as expected for most parameters, although parameters containing a list of user stations connected to a logical string was not verified (NCR 08627).

NCR 08623 was written to eliminate the need for Tivoli to receive changes in EOC component statuses from the EOC.

File Server failover, network (router) failover, and network (LAN) failover were not verified, since additional time was needed to check the validity of this portion of the test procedure.

Test Procedure Deviations: In Steps 10 and 25, the 'le0:' message should read 'le0: No carrier - cable disconnected or hub link test disabled?'

In Steps 11 and , the 'le0:' message should read 'le0: NSF server opsraid OK'.

In Steps 21, 29, 37 and 29, change 'Global Event Display' to 'Command Control window'.

In Steps 24, 51, 65, 81, 89, 94, 101, and, the Ground Script started was the pre-built proc 'E2ATC16DG'.

Step 29 applies to user station #2.

In Step 32, the two messages beginning with 'String 100' in the Expected Result/Output column should be deleted.

In Steps 40 and 42, the display page 'TLM-2000B - Health & Safety' was used instead of "TLM-2010B - Housekeeping'

Steps 40, 41, and 42 were moved after Step 51 and Steps 40, 41, and 42 were deleted.

Step 43 was deleted.

Steps 44, 46 applies to user station #1.

In Steps 50 and 64, there are 33 endpoints.

A new step was added after Step 53 to close the existing 'Failover Monitoring' display page, and bring up a new 'Failover-Monitoring' display page.

A new step was added as the first step in the Post-Failure Check-out Subprocedure (after Step 55)to bring up a new Command Control window.

Steps 66, 82, were changed to reflect that plugs connected to the Ethernet Switch apply for SUN.

In Steps 66, 69, 76, 78, 82, 84, 90, 95, 102, reference to the 'Header' page in the 'Expected Result/Output' column was removed.

In Step 71, there was no reboot.

Step 72 was deleted.

In Step 76, 'for the EOC user station 2' was deleted.

A workaround was added prior to Step 77 to change configuration files to add 'tuna' as a data server.

In Steps 82, 90, the duration in the 'Expected Result/Output' column should indicate 3 minutes.

A new step was added after Step 82 to remotely log in to the unplugged Data Server and remove endpoints.

In Steps 83 and 105, the correct test procedure is 'FOS Server and User Station Startup and Shutdown' (SYS-2000B)

In Step 85, delete the line "A new Ground Script can be successfully executed.' in the Expected Result/Output' column.

Steps 89-113 were not executed, since additional time was needed to check the validity of this portion of the test procedure.

The table at the end of the test case was updated to reflect the correct 'SYS' parameter values for each snap.

3.3.2.5 End-to-End Test Group

This section presents the detailed result information for test CONT-2010B (DSS), CONT-202B (Spacecraft Activity Log), CONT-2030B (SSR Monitoring), CONT-2040B (Spacecraft State Check), ETE-2000B (Concurrent OPS/Performance Monitor), ETE-2010B (ECT2 Scenario), ETE-2050B (Year 2000), and IST-2010B(IST Functionality)

Test Case Number and Title:	**CONT-2010B - Decision Support System (DSS)**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to perform spacecraft health and safety checks using telemetry data. This test demonstrates that the Decision Support System (DSS) can detect and report spacecraft configurations, and anomalies in Safehold mode during real-time contacts for both the Attitude, Determination And Control (ADAC) subsystem and the Electrical Power Subsystem (EPS). The test is broken down into eight (8) subtests, five (5) of which is for the ADAC subsystem and three (3) is for EPS. Of the five (5) ADAC subtests, three (3) of which is related to configuration and the remaining two (2) is related to anomaly detection. All three (3) EPS subtests is related to anomaly detection.
Pass/Fail Assessment:	PASS
Date of Test:	28 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified that the Decision Support System (DSS) can detect and report spacecraft configurations and anomalies for both the Attitude, Determination And Control (ADAC) and the Electrical Power Subsystem (EPS). The necessary telemetry points were changed through the use of the packet generator (packGen) tool to simulate configuration changes and anomaly introduction. The EPS subtest 1 to simulate a Solar Array Drive (SAD) failure was not conducted due

to the packGen tool not having enough resolution for the needed simulation. An NCR was written against packGen for EPS subtest 1. For all of the other subtest cases, the DSS responded in the appropriate manner. NCRs written 08701, 08660, 08658.

Test Procedure Deviations: Numerous limit violation messages in the event handler window hindered the progress of ADAC subtest 1. ADAC subtest 1 continued nominally after the limit violation messages were turned off.

The RTworks Data Server, packGen and RTworks were recycled after each subtest (steps 43, 66, 94, 122, 160, and 182).

Operator error in typing procedure name on step 61 (part of ADAC subtest 2).

Operator error in typing procedure name on step 107 (part of ADAC subtest 4).

Steps 154 and 155 are reversed (part of ADAC subtest 5).

Wrong procedure sent (CONT2010B011 instead of CONT2010B114) by operator in step 200. EPS subtest 3 redone.

Test Case Number and Title: **CONT 2020B - SCC Activity Log**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the ability to receive and monitor housekeeping telemetry and provide notification of new SCC activity log messages. It also is set up to verify that the user is notified of the number of back orbit activity log messages after the dump data is processed and the number of severe messages from the dumped back orbit data. Following sign-on, the telemetry driver is started. The driver sends housekeeping packets to the Decom process. The packets are decommutated. The Parameter Server and the Telemetry Archiver are updated. The Activity Log Monitor receives parameters from the Parameter Server on a packet by packet basis. The Activity Log Monitor extracts an activity log message from the parameters. The Activity Log Monitor interprets the values and creates the appropriate message. This message is then sent to the database for storage. It can be verified that the data is in the archive by using

Netscape. For each activity log message, an event message will be displayed before archiving. The event message will contain the activity log message, which is the time tag of activity log message, the activity log id, activity text, and five data words. For the dump test, following sign on, the telemetry driver is configured to send dump data to the Dump process. The Dump process receives the dump data and writes it to a file. The file is stored and the Memory Image process is notified. The Memory Image recognizes the dump as an activity log dump, and sends the dump data to the Activity Log Monitor process. The Activity Log Monitor interprets the dump data. The Activity Log Monitor sends out an event message indicating the number of new messages and of those how many are severe. This event is displayed on the Events Display. The Activity Log Monitor sends the activity log messages to the database for storage. This update will be verified by using Netscape. The last part of the test consists of using Netscape to verify the contents of the Activity Log archive. The user should be able to search the archive by time or message id.

Pass/Fail Assessment: PASS

Date of Test: 30 August, 1997; EOC LSR - GSFC Building 32

Test Conduct Summary: This test successfully verified that it is possible to monitor housekeeping data, provide notification of SCC activity log messages, and to notify the user of the number of back orbit activity log messages. Three NCRs were written : (1) Requirement F-TLM-13000 has incorrect table id. (2) Duplicate messages are not detected. (3) Activity Log Monitor does not register correctly with the Name Server. NCRs 08703, 08702, 08690.

Test Procedure Deviations: Step 5 was redlined to reflect manipulating the name_srvr database table due to a problem with the entry for the Activity Log Monitor process.

Test Case Number and Title: **CONT-2030 - SSR Monitoring**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to show that the AM-1 Solid State Recorder buffers can be monitored in real-time by the SSR manager. It is designed to show that the SSR manager can detect and handle RF failures, via UPD

messages that the status of the buffers can be reported at the end of a contact. That notification will be provided when a user attempts to schedule science data collection activities that cause overflow of any of the SSR buffers. It is designed to show that the SSR manager can accept CODA message data indicating data dropout and provide recovery procedures. It is designed to show that the updated buffer status will be displayed after recovery from unrecoverable data dropout or premature loss of contact. S/C data volume will be modeled by the planning and scheduling software along with predictions of the SSR buffer status based on science collection activities. It is designed to show that the capability exists to change the buffer playback order of the instrument science data for the SSR and that the SSR manager shall provide an analysis window that contains buffer pointers, buffer status, playback state and RF failures

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 1 September 1997; EOC - GSFC Building 32

Test Conduct Summary: This test was successful (with work-arounds) in showing that the FOS Planning and Scheduling (PAS) is capable of modeling and predicting SSR Buffer Status based upon TDRSS Contact Sessions and Science Data Collection activities. The PAS is capable of informing a scheduler when the scheduled activity causes the SSR Buffers to overflow, and is capable of supply buffer predicts and accepting buffer actual values to/from the FOS Analsysis (SSR Management software). This test was also successful in showing that the PAS was capable of correcting buffer modeling based upon the actual values received from SSR Management.

The ability to change the ordering of the SSR Buffer playbacks was also successfully executed during this test case.

This test successfully showed that the SSR Management software is capable of create SSR Buffer Playback Command Requests and sending them to the Command Request window, analyzing UPDs, CODAs, and Housekeeping telemetry data in a nominal situation.

SSR managements ability to perform error detection (determine missed data via UPDs and CODA reports)

was not successfully tested during this Acceptance Testing period due to the ParamaterServerProxy problem.

The ability to change the size of the SSR Buffers was also not successfully tested (see deviations for explanation).

Test Procedure Deviations: Steps 4 The FpSuSSRUpdater process was killed on the DataServer and restarted on the UserStation. This is a know problem as documented in NCR08572 "Corrections not scheduled when SSR resource is locked".

Step 27 The SSR Buffer Playback Request could not be sent from the FUI Command Request window to be merged with the Ground Script to be sent to the Spacecraft Simulator due to a problem with the FUI Command Request window. This problem is documented in NCR09119 "Unable to accept SSR Commands using Command Request Tool".

Steps 45 - 48 Were not verified due to a problem with the ParameterServerProxy. This problem is documented in a level one NCR, NCR08568 "ParameterServerProxy broken pipe (Ground Parameters)".

Steps 51 - 58 Were not verified due to software functionality not existing. NCR06360 "No software to allow user to allocate buffer space in SSR" documents this problem.

Test Case Number and Title: **CONT-2040B Spacecraft State Check**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary This test is designed to verify that an expected state table can be generated for comparison with parameters from the parameter server. Also it is designed to verify that an event will be displayed for all mismatches between expected CMS values and parameter values from the parameter server after a comparison is made. That the system is capable of handling good telemetry. That via commands, new telemetry data can be compared with a new table copied from CMS. And finally that the system has the capability to overwrite the expected state table with telemetry data (baseline expected spacecraft values.)

Following sign-on, an events display window is brought up, the first state check expected state table is loaded, an alphanumeric display page is brought on line, the

telemetry server is brought up. Following this the parameter server is started. Telemetry arrival is displayed on an alphanumeric page, event messages on the events display page occur when there are any mismatches between the expected state table and the telemetry coming in. The second expected state table is then loaded for a second set of comparisons where there will be good agreement. Also, for the second expected state table comparison telemetry will be sent on the Q channel(For the first comparison telemetry is sent on the I channel) and the explicit Load step will be omitted to see if it is performed automatically on the Evaluate Step. Here, the S/C values are then baselined by overwriting the values in the expected state table with values from the parameter server. The third expected state table is generated with all zeroes and a comparison is made with the parameters from the telemetry server.

Pass/Fail Assessment: PASS

Date of Test: 30 August 1997; EOC-GSFC Building 32

Test Conduct Summary   This test successfully verified that an expected state table can be generated for comparison with parameters from the parameter server. It also verified that an event will be displayed for all mismatches between expected CMS values and parameter values from the parameter server after a comparison is made; that via commands, new telemetry data can be compared with a new table copied from CMS; and that the system has the capability to overwrite the expected state table with telemetry data (baseline expected spacecraft values). One NCR (#08740 default channel of state check) was written during the test.

Test Procedure Deviations: Prior to the test, the process FmGsGroundSchedule had to be killed and re-started.

The AM1_Ground_Schedule.gs and Expected_State.data tables had to be deleted.

The State Loade Channel had to be set to the I channel (should be I by default, but is not).

Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 9 redlined to enter current ECL directive for statecheck load.

Step 10 redlined to bring up current statecheck alphanumeric display page.

Step 11 redlined to use the current telemetry driver.

Step 13 redlined to enter current ECL directive for statecheck evaluate.

Step 19 redlined to use the current telemetry driver.

Step 21 redlined to enter current ECL directive for statecheck channel setting.

Step 22 redlined to enter current ECL directive for statecheck evaluate.

Step 27 redlined to enter current ECL directive for statecheck baseline.

Step 28 redlined to enter current ECL directive for statecheck evaluate.

Step 33 redlined to enter current ECL directive to stop the telemetry driver.

Test Case Number and Title:	**ETE-2000B - ConcurrentOps/Performance Monitor**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-001-003)
Test Summary:	This testcase was designed to verify that the ECS can meet system performance requirements under peak operational loads executing system functionality. Specifically, perform a peak operational workload while key resource utilization remains below 50%.
	The test consisted of eight contiguous parts. The first part of the test performed FOS initialization. The DataServer, RealTimeServer and four UserStations were initialized. The UNIX date command was used to record WorkStation initialization times, the time required to connect to a string and times required to initialize tools and display pages. The second, fourth and sixth parts of the test consisted of four users performing planning and scheduling, load generation, load management, creating display pages and procedures, and performing Analysis requests.

The third portion of the test consisted of a ten minute spacecraft contact session, activities included 16 Kbps HK on the I and Q channel, NCC UPD data, EDOS CODA data, and command activities with a commanding rate of 10 Kbps. Several UserStations were used to monitor the telemetry decom through the use of telemetry and event displays. TCPDUMP was used to monitor the CmdToEdos port in order to estimate the time delay between when an emergency command is SENT and the time it reaches the network.

The fifth portion of the test was identical to the third with the except for 1 Kbps Diagnostic data on the Q and the addition of an Analysis request running on the DataServer. The seventh portion of the test was also identical to the third with the exception of the Housekeeping data rate be pumped up to 25 Kbps on the I and Q.

The final portion of the test will be system shutdown, where all WorkStations will be brought down in an orderly fashion.

Prior to test execution system and process accounting tools was initialized to capture performance the performance characteristics of the system. Following execution, the data collected will be analyzed and presented to show the CPU, Disk I/O, and Memory usage on each of the workstations. In addition, the response times for commanding, system initialization, and display invocations will be analyzed..

To be considered successful this test would have had to shown that:

The EOC outputs single emergency commands to the network within 500 milliseconds of the 'SEND' button being hit.

The EOC computer processing, storage, and network utilization is less than 50% during any 20 minute period of this test

The FOS is capable of continuously decommutating data throughout contact portions of the testing period (i.e. NO data loss messages)

The FOS is capable of receiving, decommutating, and storing housekeeping telemetry at rates up to 50 Kbps.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 30 August 1997; EOC - GSFC Building 32

Test Conduct Summary: All step of this test were conducted without any major conflicts. The test results section of this report will present the system performance data collected. All activities to be performed were successfully executed.

There was one new NCR written as a result of this testing effort. NCR08706 "RealTime Server Dropping Packets at 16 Kbps" was written against the Decom process dropping data at rates lower than 50 Kbps. No NCRs were verified as a result of this testing effort.

Test Results: The results of this test are summarized on the following paragraphs. Results are divided into for areas: commanding, telemetry decom, system response times, and resource utilization. Analysis of the test results in the area of resource utilization is still ongoing, results shown here are for CPU only.

In general, most performance requirements failed to be fully satisfied with FOS Release B software. Resource utilization on the UserStations and the Sybase Database server far exceeded the requirement for less than 50% utilization during any 20 minute period.

Commanding: The EOC delay associated with building and sending simple commands was seen to be in the area of 500 milliseconds.

The delay for the first FS1 command with sub-mnemonics was observed at over seven and a half seconds, this does not come close to meeting out 500 millisecond requirement. Subsequent commands do not feel this delay.

The performance requirements for commanding received a verification status of partial failure. This problem is documented in NCR08119 "FS1 Commands".

Telemetry Decommutation: Missed Packets at 16 Kbps Housekeeping on the I and Q (relatively few compared to the number of dropped packets seen during ECT-2.

Missed Packets at 25 Kbps Housekeeping on the I and Q (slightly more than at 16 Kbps rate, but still nowhere close to ECT-2)

System Response Times:

Startup Scripts	Completion Time
DataServer	3:01
RealTimeServer	3:02
	2:25
	2:42
UserStation-PAS	3:00
	3:15
	3:32
	3:45
(telemetry online)	6:24
UserStation-NOPAS	1:31
	1:31
	1:35
	2:07

User Activities	Completion Time
Connect to String	2:21
	2:22
	2:33
	2:21
	1:28
Bring up Command Control Window	:32
	:31
Bring up Display Page	1:04
(no telemetry online)	1:09
Bring up Display page	Didn't Appear
(telemetry online)	Didn't Appear
Initialize RTS Load Builder	:27
Initialize Table Load Builder	:07
Initialize Binary Load Builder	:02
Initialize Procedure Builder	:25

Resource Utilization: See Excel Charts for details on CPU utilization

UserStations and Sybase Server exceeded to 50% utilization requirements during periods of telemetry receipt.

Data was of extremely poor quality, resulting in numerous limit violations error messages being generated. These event messages made the UserStations unusable until they subsided.

Test Procedure Deviations: Steps 3 Netstat was not run during the testing effort, therefore not network utilization statistics were collected.

Step 4 Fifteen minutes of static data was collected due to the late starting time of the test and the test duration.

Step 5 The reflectors used for commanding were killed on the DataServer following DataServer Startup.

Steps 11 and 16 ETS was used instead of PachGen to support the RealTime data needs of the testing effort.

Step 13 Although the manual commanding activities were performed, the capturing of the commands response times was not captured. This data was collected during step 16.

Step 18 The TlmArchiver process on the RealTimeServer crashed and the RealTimeServer needed to be restarted after the simulated Spacecraft Contact Session.

Multiple Steps As UserStations crashed for various reasons they were restarted. Times to reinitiate the servers were recorded for analysis.

Test Case Number and Title: **ETE-2010B - ECT2 Scenario**

Reference to Test Documentation: FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that core FOS capabilities demonstrated in EOC Compatibility Test #2 (ECT-2) are also provided as part of the RRR Release B delivery. This test includes key Pre-contact, Contact, and Post-contact capabilities within the FOS Planning and Scheduling, Command Management, Command, and Telemetry subsystems. Capabilities of the FOS User Interface, Data

Management, and Resource Management subsystems are also utilized. Pre-contact capabilities include defining and scheduling activities; building and scheduling ATC, RTS, and table loads; and generating a DAS and ground script. Contact capabilities include transmitting commands contained in pre-built procs at various rates; uplinking the ATC, RTS, and table loads; monitoring several types of telemetry; and verifying command receipt. Post-contact capabilities entail comparing loads and dumps.

Pass/Fail Assessment: PASS (SUN Servers)/ FAIL (DEC Servers)

Date of Test: 22 August 1997 (Patch 10 on SUN Servers); EOC - GSFC Building 32

27 August 1997 (Patch 11 on DEC Servers); EOC - GSFC Building 32

Test Conduct Summary: The first test, which was conducted on SUN Servers and utilized members of the Flight Operations Team (FOT) as test participants, successfully verified the capability to build activities; schedule loads for uplink; transmit commands to EDOS, via EBnet, at uplink rates compatible with the Space Network and the S-band Contingency Ground Stations; receive real-time telemetry from EDOS, via EBnet; compare loads and dumps; and provide the capability to indicate the logical string identifier for windows displaying telemetry values. An NCR was written by the FOT on RTS load validation failure.

This second test, which was conducted on DEC Servers after installation of Patch 11 and utilized members of the FOT as test participants, successfully verified the capability to build activities and schedule loads for uplink. When processing 16 kbps housekeeping telemetry on the Q-channel, the decommutation process failed (probably due to the inability to process certain large telemetry values on the DEC Server) (NCR 08630). A command proc couldn't be 'saved as' (NCR 08634) There were some missing messages on the event display (NCR 08676). There were instances when the Command Control window locked up when trying to turn off command verification and telemetry verification (CV and TV), and execute a Ground Script with a command uplink rate of 10 kbps (NCRs 08631, 08633, and 08636).

It took two attempts to set the command uplink rate (NCR 08635). A misleading event message was displayed following the failure of a Real-Time Server process (FcFdFormat) and an attempt to change command authority (NCR 08670). The Real-Time server and user stations were re-initialized, but similar problems were encountered with decommutating certain telemetry and the Command Control window.

The following capabilities were not executed during this regression test: diagnostic and health & safety telemetry receipt and decommutation, dump generation, dump/image comparison, and command uplink for rates of 2 kbps, 1 kbps, and 125 bps.

Test Procedure Deviations: (SUN Servers)

Since the time of ATC load uplink was a 'moving target', Steps 10-13 were executed several times to change the times of ATC command execution.

The activity name in Step 13 should be 'ATC_EVT3.2'.

In Step 16, the RTS# should be '12', the Purpose should be 'ETE_TEST'.

In Steps 16-19, the UTC fields were corrected and 'S/C Time' should be 'Delta Time'.

A workaround was used in Steps 13 and 23 to copy the 'load uplink' and 'table load uplink' files to the '/fosb/test/am1/loads' directory.

In Step 23, workaround to change table load name to 'AM1_TBL_TESTKM_1' and to round off times to whole hours.

Step 32 was not executed, since EDOS and ETS/MPS were utilized to provide CLCWs and command verification status.

Steps 40 and 55 were not executed, since EDOS could not support simultaneous I and Q-channel telemetry.

Rebooted Real-Time Server and the two user stations at Step 44, when the first command in the 'E2ABC1A' proc did not execute, and then the command control window dialog box locked up. Also a verification failure occurred in the second ATC Proc.

In Steps 47 and 50, used the following newly created loads in place of the RTS, ATC, and TBL procs used during ECT2:

- RTS: 'LOAD AM1_RTS_1_MOD_drlt20 1 1'

- ATC: 'LOAD AM1_ATC_199723407_0_1 1 1'

- TBL: 'LOAD AM1_TBL_TESTKM_1 1 1'

After Step 47, executed ATC dump and Image Compare for the ATC; also a TABLE dump and Image Compare for the TABLE. (The 'Image Compares' were executed here instead of in Step 58.)

In Step 52, used the following newly created loads in place of the RTS and TBL procs used during ECT2:

- RTS: 'LOAD AM1_RTS_1_MOD_drlt20 1 1'

- ATC: 'LOAD AM1_ATC_199723413_0_1 1 1'

- TBL: 'LOAD AM1_TBL_TESTKM_1 1 1'

In Step 57, used the following newly created loads in place of the RTS, ATC, and TBL procs used during ECT2:

- RTS: 'LOAD AM1_RTS_1_MOD_drlt20 1 1'

- ATC: 'LOAD AM1_ATC_199723415_0_1 1 1'

- TBL: 'LOAD AM1_TBL_TESTKM_1 1 1'

In Steps 50, 52, and 57, executed RTS, ATC, and TABLE dumps.

In Step 57, executed 'E2LOCKOUT' as the last PROC

After Step 57, Initiated 1 kbps Health & Safety telemetry on Q channel

(DEC Servers)

The activity name in Steps 8, 10, 11, 12, and 13 should be '2010B_test'.

Steps 13-23 were executed successfully prior to the start of this test.

A workaround was used in Steps 13 and 23 to copy the 'load uplink' and 'table load uplink' files to the '/fosb/test/am1/loads' directory.

In Steps 26 and 29, workaround to bring up the 'TLM-2010B' telemetry display page instead of the 'ECT2 telemetry display page did not come up.

Step 32 was not executed, since EDOS and ETS/MPS were utilized to provide CLCWs and command verification status.

Step 40 was not executed, since EDOS could not support simultaneous I and Q-channel telemetry.

Rebooted Real-Time Server and the two user stations at Step 44, when the first command in the 'E2ABC1A' proc did not execute, and then the command control window locked up.

Steps 44 to 79 were not executed.

Test Case Number and Title:	**ETE-2050B - Year 2000**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the capability of the FOS software to successfully handle the year 2000 time change. FOS sub-systems should be able to timestamp the incoming telemetry with the rollover date and continue to function normally. The test is designed to exercise each sub-system of the FOS software.

Following sign-on (Year 1999, Day 365, Hours 23 and Minutes 30), alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated and run for approximately 45 minutes, broadcasting Housekeeping, Health & Safety, and Standby telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and snapped at specified times. Raw parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics. Access to the archive is performed during and after the archive process to ensure proper cataloging of received data. Test steps are then provided to display, dump and compare archive content with test tools. Replay information (i.e. spacecraft ID, start/stop time, data type,

replay time) is then entered via selected Replay Controller menu options. The replay of data is initiated and display pages are displayed and printed. They are analyzed and compared post-test against telemetry archive file dumps (and against each other) to ensure accurate parameter values. The event message generator is then invoked, multi-casting event messages for display. The graphical event timeline functionality is then verified, including event message formatting, timeline indicators, time correlated visual indicators, and event message selection/graphical timeline interaction. The Netscape page containing the event history database is brought up and event history is accessed through the use of the event history access form. All necessary data is then entered into the form and then submitted. An event history is returned and it is verified that the event history matches the user's request. The event history form is accessed again and different times, subsystems, and ID numbers are submitted. The display builder will then be used to modify an existing user page, delete an existing user page, modify mnemonics and delete mnemonics. The display builder was used to create a graph and a table. The graphs and tables will be customized and then display mnemonic values in several different formats from incoming telemetry via the telemetry driver. The Analysis Request tool is invoked and a historical request is generated, with selected options including request name, start/stop time interval, parameter names, and sampling rates. The requests are saved, and then submitted for dataset generation based on the menu options previously submitted. ASCII printouts are generated and analyzed post-test to ensure dataset accuracy and integrity.

This test also, demonstrates that a user with CAC privileges is provided the tools necessary to initiate the execution of a ground script that spans a year change and century change to process safety, critical, submnemonics, and prerequisite state checks for commands.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 31 August 1997; EOC-GSFC Building 32

Test Conduct Summary

This test successfully verified the capability of the FOS software to successfully handle the year 2000 time change. FOS sub-systems were able to timestamp the incoming telemetry with the rollover date and continue to function normally. The telemetry was archived and cataloged properly. The data was then successfully replayed. The graphical event timeline functionality was verified for the year 2000, including event message formatting, timeline indicators, time correlated visual indicators, and event message selection/graphical timeline interaction. The event history was successfully accessed through the use of the event history access form. The display builder allowed the user to modify an existing page, delete an existing page, modify mnemonics and delete mnemonics. The display builder also allowed the user to build and customize a graph and table that displayed mnemonic values in several different format from the telemetry driver. An analysis request was submitted and a dataset was created. Data integrity was not compromised. Leap Year was not tested. One NCR was written (NCR 08790).

Successfully demonstrated that a CAC user can initiate the execution of a ground script that spans a year change and century change to process safety, critical, submnemonics, and prerequisite state checks for commands.

Test Procedure Deviations:

Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Reference test case ANA-2000B for test procedure deviations.

Test Case Number and Title: **IST-2010B - IST Functionality**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:

This test verifies the FOS capability to support an IST user in 'connected' mode. There were no unique procedures for this test case. The process for verifying IST workstation functions was to execute procedures or subset of procedures from other test cases since IST functionality consists of a subset of FOS Release B software. Testers were notified of the requirements that are to be verified by their test cases. The testers then

redlined procedures needed to verify the requirements applicable to an IST.

Pass/Fail Assessment: PARTIAL PASS/FAIL

Date of Test: 30 - 31 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test verified requirements grouped in the following categories: Analysis (ANA), Command (CMD), Command Management (CMS), Data Management (DMS), Flight Operations (FOS), User Interface (FUI), Planning and Scheduling (PAS), Resource Management (RMS), and Telemetry (TLM). Test conduct summary for each category is as follows:

ANA - During the Analysis portion of IST-2010B, 0 of 26 requirements were verified. All 26 Analysis requirements remained unverified. This portion of the test was stopped due to NCR ECSed08801.

CMD - During the Command portion of IST-2010B, 0 of 3 requirements were verified. All 3 Command requirements remained unverified. This portion of the test was stopped due to NCR ECSed08742.

CMS - During the Command Management portion of IST-2010B, 1 of 27 requirements were successfully verified; 25 of 27 requirements remained unverified due to NCRs ECSed07622, ECSed08689, ECSed08743, and ECSed08745; and 1 of 27 requirements failed due to NCR ECSed08744.

DMS - During the Data Management portion of IST-2010B, 1 of 14 requirements were successfully verified; 1 of 14 requirements remained unverified due to NCR ECSed08743; and 12 of 14 requirements failed due to NCR ECSed08736.

FOS - During the Flight Operations portion of IST-2010B, 2 of 7 requirements were successfully verified; and 5 of 14 requirements remained unverified due to NCRs ECSed08744 and ECSed08802.

FUI - During the User Interface portion of IST-2010B, 26 of 170 requirements were successfully verified; 4 of 170 requirements were partially verified due to NCRs ECSed06355 and ECSed08334; 130 of 170 requirements remained unverified due to NCRs ECSed06380, ECSed08335, ECSed8470, ECSed08485, ECSed08489,

ECSed08490, ECSed08491, ECSed08492, ECSed08498, ECSed08546, ECSed08741, and ECSed08802; and 10 of 170 requirements failed due to NCRs ECS03967, ECSed08327, ECSed08470, ECSed08489, ECSed08490, ECSed08491, ECSed08698, ECSed08744, and ECSed08794.

PAS - During the Planning and Scheduling portion of IST-2010B, 18 of 43 requirements were successfully verified; 15 of 43 requirements remained unverified due to NCRs ECSed06676, ECSed08476 ECSed08525, ECSed08545, ECSed08653, ECSed08713, ECSed08721, ECSed08744, ECSed08754, ECSed08762, ECSed08799, and ECSed08800; and 10 of 43 requirements failed due to NCRs ECSed08025, ECSed08540, and ECSed08798.

RMS - During the Resource Management portion of IST-2010B, 2 of 6 requirements were successfully verified; and 4 of 6 requirements remained unverified due to NCR ECSed08785.

TLM - During the Telemetry portion of IST-2010B, 17 of 34 requirements were successfully verified; 2 of 34 requirements were partially verified due to NCRs ECSed08289 and ECSed08746; 2 of 34 requirements remained unverified due to NCR ECSed08785; and 13 of 34 requirements failed due to NCRs ECSed07859, ECSed08697, ECSed08746, ECSed08751, and ECSed08783.

Test Procedure Deviations:　　　**ANA** - Step 1 used a workaround that ftp'ed a telemetry archive file from EOC tlmarchive to IST tlmarchive.

CMD - No deviations were used.

CMS - No deviations were used.

DMS - Step 7 - add initiate the DMS Event Message Driver from Local User Station.

Step 15 - Change to www.eoc.ecs.nasa.gov.

Step 17 - Delete item #3.

Step 18 - Netscape hung. Process was killed and re-executed.

After Step 19 - Add repeat step 18.

Step 26 - Add item # 6 (click on 'Continue Submission').

Step 28 - Add item # 6 (click on 'Continue Submission').

FOS - Step 6 used a workaround since the Status Window would not come up automatically. A user generated display page was brought up (the Fail-over Monitoring function was used).

Steps 9 used the same workaround as in step 6.

FUI - User Customization: Step 5 - Loaded the user initialization file into data/fosb/ist/AM1/bin/sun_sparc_5.5.

Step 21 - Select the option from the Tools window.

Display Builder: Step 27 - Change to IST_2010B.

Step 29 - Change to /data/fosb/ist/AM1/displaydefs/IST_2010B.

Step 31 - Change to /data/home_dir/istuser2/Pages/IST_2010B.

Step 32 - Change to IST 2010B.

Step 35 - Add APID=1.

After Step 37 - Add Quit Telemetry.

After Step 38 - Add Step # 2 and add /data/home_dir/istuser2/Pages/IST_2010B.

Remove Steps 41, 42, 43, 44, 45, and 46.

Step 48 - Add /data/home_dir/istuser2/Pages/IST_2030B_alpha.

Step 49 - Add /data/home_dir/istuser2/Pages/IST_2030B_alpha.

Step 52 - Add APID=1.

Step 53 - Add APID=1.

Remove Steps 54 and 55.

RMS - No deviations were used.

ANA - Step 1 used a workaround that configured the SETUP.SITE file for PASMODE-TEST.

TLM - No deviations were used.

3.3.2.6 Data Base Test Group

This section presents the detailed result information for test DBS-2000B (DB Ingest/Validation & ODF Generation, DBS-2010 (Operational Data Backup/Restore), DBS-2020B (Database Reporting), and DBS-2030 (Database Editing).

Test Case Number and Title:	**DBS-2000B - Database Initialization,PDB Ingest and Validation, Operational Database and Operational Data File Generation**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify DMS capability to support the ingest and validation of command, telemetry, constraint, and activity definition files into the Project Database(PDB), upon receipt of the files from the spacecraft contractor. The test begins with the initialization of the database and associated tables. Once the database is initialized, scripts are invoked to ingest command, telemetry, constraint, and activity definitions files from a dedicated directory location into the invalidated project database tables(s). The test conductor will compare the populated database tables with the definition files received from the spacecraft contractor to ensure the ingest of all files into the Sybase tables.
	Once the file ingest is complete, two scripts are invoked to perform the validation of the command, telemetry definition files that reside in the invalidated database table, constraint, and activity definition files will also reside in the invalidated database table. Upon completion of the validation scripts, the test conductor verifies that valid definition files are moved from the invalidated to the validated database table, those definitions that failed the validation process are not moved to the validated database and an error messages describing the reason for validation failure is written to a log file. Following the validation process the operational database and the Operational Database Files (ODFs) are generated. Sample test data containing invalid definition files. The test conductor will ensure those files did not pass validation
Pass/Fail Assessment:	PASS
Date of Test:	23-24 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The test conductor is able to initialize the database and associated tables. Once the database is initialized, the test conductor is able to ingest the telemetry and command definition files provided by the spacecraft contractor. The definition files are moved from the /fos/am1/test/pdb/input/xxx directory (where xxx = current version of the database) into the Sybase database. Once the database has been populated, the test conductor is able to run DMS scripts to invoke telemetry and command validation. At the conclusion of the validation process, the validate PDB database is populated with the definitions that passed validation error free. Any definitions that fail the validation process will be written to a validation log and are not moved to the validated database. Operational database and ODFs were generated without error. The invalid test records are rejected, and are not moved into the validated database. NCR written 08591.

Test Procedure Deviations: operator error "Step 6 -   exit"

restarted: % isql -Usa -Passwd

Passwd: <ret>

>use am1_fos_val (then continue with)

>sp_configure "allow updates",0

>go

>exit

Step 17 - Deviation - use script, netscape does not populate unvalidated tables at this time % cd /fosb/test/am1/db
% ./pdb_load.script

Repeat step 17 to verify that the files were loaded

New Step 17 = P

Step 17b - Deviation - Add test data to unvalidated database.

insert test definition for telemetry

% cd ../testdata

% isql -U$UNAME -P$PASSWD<DB_Update_b.sql

Bulk copy ECT-2 table definitions as follows:

```
%bcp am1_fos_unv..cmd_flddef_ppdb in cmd_flddef.pdb
-c -U$UNAME -P$PASSWD
```

```
% bcp am1_fos_unv..cmd_tbldef_pdb in cmd_tbldef.pdb
-c -U$UNAME -P$PASSWD
```

Insert test definitions for table load database:

```
% isql -U$UNAME -P$PASSWD
```

```
> use am1_fos_unv
```

```
> go
```

```
> :r cmd_flddef.sql
```

```
> go
```

```
> :r cmd_tbldef.sql
```

```
> go
```

```
> exit
```

Insert additional prerequisite state definitions:

```
% isql -U$UNAME -P$PASSWD<insert
PstateCmds.script
```

Bulk copy constraint definitions

```
% cd ../db
```

```
% bcp_conpdb_in.script
```

Set stored command indicator flags in cmd_desc_pdb table

```
% isql -U$UNAME -P$PASSWD
```

```
> use am1_fos_unv
```

```
> go
```

```
> update cmd_desc_pdb set st_cmd_ind=1 where
st_cmd_ind=0
```

```
> go
```

```
> exit
```

Add additional requested test data:

% isql -U$UNAME -P$PASSWD<DSS_FIX

End of Deviation

Step 18b - Deviation - tlm. worked, cmd didn't, no output msg. for tlm.

% cd /fosb/test/am1/db

% val_cmdpdb>val_cmdpdb.lis

In another xterm window:

% tail -f val_cmdpdb.lis (to monitor cmd pdb validation log file.

When cmd val completes:

% val_conpdb.script>val_conpdb.lis

Go on to step 19 to verify files were populated with validated records.

Step 21 - Deviation/Configuration error: db/reports directory permissions were reset to read/write and Step 21 was repeated and passed.

Step 22 - Deviation/workaround:

% cd fosb/test/am1/db

% gen_ops_db.script>gen_ops_db.lis

Step 22a - Deviation - Add test data to ops database.

% cd fosb/test/am1/testdata

% isql -U$UNAME -P$PASSWD

> use am1_fos_ops

> go

> :r cmd_dump_data.sql

> go

> update cmd_vardata_pdb set max_value=`500000.0'

where cmd_mnem=`FS1_MLOAD_TBLINIT' and

subfld_name=`WORD_OFFSET'

> go

```
>  update cmd_vardata_pdb set max_value=`500000.0'

 where cmd_mnem=`FS1_MLOAD_TBLINIT' and

subfld_name=`WORD_COUNT'

> go

> exit

 Insert Packet Defs before ODF generation

% cd fosb/test/am1/db

> isql -U$UN AME -P$PASSWD

> use am1_fos_ops

> go

> :r packet_defs_data1.sql

> go

> :r packet_defs_data2.sql

> go

:r packet_defs_data3.sql

> go

> :r packet_defs_data4.sql

>go

> exit
```

Test Case Number and Title:	**DBS-2010B - Data Backup / Restore**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify DMS provides the user with the capability to perform backups on the PDB files and database transaction logs. Initially a backup device must be created. Once the backup device has been made FOS Database backups can be initiated. Backups will be performed using FOS Database Utilities Web pages. When FOS Dtabase backups are complete, verify a backup file exits for each database transaction log dblog_fosops, dblog_fosunv, dblog_fosval. This test is also designed to verify DMS provides the user with the capability to restore any lost or corrupted data in the

database and/or the transaction logs through the use of the Sybase "load" utility.

Pass/Fail Assessment: PASS

Date of Test: 1 September 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the FOS capability to perform backups and restore of the PDB files, and database transaction logs definition files using the FOS Database Utility Web pages.

Test Procedure Deviations: Steps 7 and 12 were updated to reflect the work around used to delete the db_backup.dat & dblog.dat (NCR 08911) before executing the restores from the FOS Database Utility Web pages .

Test Case Number and Title: **DBS-2020B - Database Reporting**

Reference to Test Documentation: FOS Release B test procedures (322-CD-001-003)

Test Summary: This test is designed to verify DMS provides the user with the capability to generate, view and print PDB, Load Catalog, and FDF reports. The user will be able to produce an entire PDB report or a partial report. The partial report requires the user to specify the Telemetry or Command mnemonic.

Pass/Fail Assessment: Partial PASS

Date of Test: 15 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The success of this test is based on the user's capability to generate, view and print entire or partial PDB, Load Catalog, and FDF reports, using the FOS Database Utility Web pages**.**

Test Procedure Deviations: Step 8 & 9 - Cannot select PDB TLM/CMD reports by mnemonic NCR# 07950 but information can be obtained from complete report.

Step 13 & 14 - Currently unable to generate FDF Reports. NCR# 07952.

Test Case Number and Title: **DBS-2030B - Database Editing**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:	This test is designed to verify DMS provides the user with the capability to modify, add, or delete a command, telemetry, or event Project Database (PDB) definitions that reside in the FOS database.
Pass/Fail Assessment:	PASS
Date of Test:	7 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The success of this test is based on the user's capability to edit FOS PDB definition files. Using the FOS Database Utility Web pages the user should be able to modify, add, or delete a command, telemetry, or event definition.
Test Procedure Deviations:	Step 17 - When a modification was made to a hazardous command via the web html page all instances with the same PID# were updated. A hazardous command definition for PID XXX word 1 was modified. This caused the hazardous command with the same PID but WORD 2 to also be modified. Both PID's were modified to be WORD 1. NCR# 08299
	Step 17 - When attempting to update a unique instance in a multiple match find on a command parameter id, all values with same command parameter id are updated. NCR# 08288
	Working in the netscape environment on FOS command fixed data specifics. Problem involves HTML code: search criteria needs to be further restricted to include more field values.
	There is a requirement to bring up an edit log presenting edits made to PDB, but no edit log is found. Selected Activity log from the database access window and received "404 not found - URL/Activity Log Req. Html was not found on this server" NCR# 07953

3.3.2.7 User Interface Test Group

This section presents the detailed result information for test FUI-2000B (Screen Management), FUI-2020B (User Customaization), FUI-2025B (Data Mover), FUI-2030B (Display Builder-Alphanumerics), FUI-2040B (ECL Directives), FUI-2050B (Procedure Builder), FUI-2060B (Procedure Control and Execution), FUI-2080B (OASIS/CSTOL Conversion), FUI-2090B (User Authentication and Display), FUI-2100B (Room Builder), FUI-2110B (Display Builder Graphs & Tables), FUI-2115B (Display Builder Schematics), FUI-2120B (Document Reader), FUI-2130B (E-Mail), Fui-2140B (Quick Message Generator), and FUI-2150 (On-line Help).

Test Case Number and Title: **FUI-2000B - Screen Management**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify additional capabilities for control and management of the User Station desktop environment (see also test FUI-2100B) including the three-line event area display and capabilities relating to room and window assignments using room/window list. The test starts with initializing the EOC and bringing up a User Station. Following initialization, rooms and windows are accessed via rooms list, user specified rooms, telemetry window list and tools window list. Rooms are modified by changing size, location and focus of windows. The event driver is invoked, resulting in event messages broadcast onto the FOS LAN. The three most recent events are displayed in the event display area and event types are selected by use of the event filter. Command line editing capabilities are demonstrated.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 15 August 1997; EOC - GSFC Building 32

Test Conduct Summary: Following the startup of the user station, it was verified that a command line area that allows the user to issue directives from the workstation keyboard is available and functions; the user has access to a list of available rooms, a list of available windows, a list of additional tools, and a list of procedures that are available; and the user is allowed to perform typical windowing desktop control with the pointing device, such as, window focus selection, window movement, window re-sizing, window closing and window iconifying. Buttons are provided in the control window to allow the user to select user specified rooms, however, the ability to assign rooms to the buttons has not been provided at this time. It was verified that the user could initiate functions from a control window using a pointing device. Event messages were filtered based on event type and subsystem. The FOS provides a display of the 16 most recent input lines, but not 20. The system does not allow the entries to be retrieved for editing. NCR 08791 was opened covering this. The user cannot use the function keys to initiate functions in this release, see NCR 08794.

NCR 04391 was written against the Event Driver Tool used in this test case and it was verified as fixed.

Test Procedure Deviations::   The test case was started at Step 4. Since the Data Server, Real-Time Server and User Station was already up from a previous test.

Step 10. Had to reduce the size of Event Display after expanding it in order to get the right side of the window to refresh. NCR 07546 covers this problem.

Step 13. Had to replace Tlm Win... page CDH-ACTCATB-DISP with CODA-StatusBlicks

Step20. Had to substitute a room instead of using R1 since user selected rooms are not currently assigned to the R1—R5 buttons. NCR 08491. Room SystemRoom1 was selected but, since it had now windows other than the Control Window assigned, MyNewRoom1 was then selected to be able to complete Step 21.

Step 22. Because of the workaround in Step 20. The left arrow button had to be clicked on twice to get back to the EventManagement room.

Test Case Number and Title: **FUI-2020B - User Customization**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the capability for the users to customize those parts of his environment that are common to all window and rooms and provide the user a personalized environment. This will include such items a default printer, default data directories, type of screen snap, default color intensities for real-time windows default colors for non real-time windows, default font styles, and default room definitions. The test case verifies default settings following initial user log-in.. The capability to specify the default printer, data directories within the system, color intensities for the real-time windows, and font styles to be used from a predefined selection are verified. The FOS capabilities to specify the type of screen snap to perform, to snap a window, to specify the color intensities for the real-time windows, to specify the colors for non real-time windows, and to select the font styles to be used from a predefined selection are verified.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 15 August 1997: EOC - GSFC Building 32

Test Conduct Summary: The User Station was brought up and the default settings for printer, data directory, and function key assignments were verified. There were no default room selections assigned to the R1 - R5 buttons. The Rooms customization dialog box came up okay but default room selections cannot be made, NCR's 07626 and 08491. Default color intensities are provided for the dynamic pages but using the Dynamic Page Colors customization window, the user settings for the various colors has no effect on the dynamic page and a default selection is not available, NCR 08490. Default colors and fonts for non-realtime windows are initially assigned in the system and the user can modify the colors and fonts using the Application Colors & Fonts customization window. The FOS Operations Tools Manual for the ECS Project does not properly specify the steps to change the colors and fonts and the colors cannot be selected from a predefined palette, NCR 08492. The default printer assigned by the system cannot be changed using the Printer customization window, NCR 08470. The Data Directory customization window does not show the current directory or provide a means of designating a default directory, NCR 8489.

Test Procedure Deviations: The test case was started with Step 4 because the Data Server, Real-Time Server and User Station was up from the previous test case.

Step 13. Due to the problem with Room customization window, the tool User Customization had to be reopened.

Step 21. The system does not recognize the ECL directive Tool Event_Display. The Event Display was brought up using the Tools... selection button and selecting Event_Display-Global.

Step 22. Data_Source Selector is no longer a tool available in the system. The ECL directive STRING CONNECT STRING=100 needed CONFIG=MIRROR added to make it syntactically correct. ECL directive STRING CONNECT STRING=XXX is not correct for the current system since only one realtime string is created when the system is initialized. The directive was not entered and executed.

Step 37. Step was redlined to delete Click on 'Apply' in five places. The Monospace Font selected was redlined to read Courier and General Purpose Font selected was redlined to read Helvetica.

Test Case Number and Title:	**FUI-2025B - Data Mover**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the capability for users at the EOC site to transfer files that contain spacecraft, instrument, and ground system information using the Data Mover. The test will also verify the user capability to manage their own file space.
Pass/Fail Assessment:	PASS
Date of Test:	05 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the capability of the user to transfer files from his user's home directory to the system transfer directory; request files to be sent from the system transfer directory to his home directory; delete files from the local storage area; to select files from available categories; deselect files that were selected; view the selected files to be sent; be notified that a file transfer is in progress, a file transfer has been completed, and a file transfer error has occurred. As a result of completing this test procedure, NCR's 06380 and 08009 are verified as fixed and were closed.
Test Procedure Deviations:	Redlined the Test Case Description to delete 'and IST'. The IST requirements originally assigned to this test case were moved to another test case.
Test Case Number and Title:	**FUI-2030B - Display Builder (Alphanumeric Pages)**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to create a customized 'User page' from Display Builder. The user will be able to build/customize a real time display that will display mnemonic values from incoming telemetry and then save the display as either a local or system copy. The user will also be able to modify an existing user page, delete an existing user page, modify mnemonics, and delete mnemonics.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 16 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the FOS capability to create a customized 'User page' from Display Builder. The ability to build/customize a real time display, display mnemonic values from incoming telemetry and then save the display as either a local or system copy was verified. The ability to modify an existing user page, delete an existing user page, modify mnemonics, and delete mnemonics was verified. Two NCRs were written against req. FUI-07200 items N and R. The capability to display descriptors was not verified an NCR was previously written against the capability (NCR 07842). The following NCR was written 08335.

Test Procedure Deviations: Before step 39 relined to add quit from telemetry page and repeat step 3.

Before step 55 relined to add quit from telemetry page and repeat step 3.
Step 55 redlined to change FUI_2030B_alpha1.pms.

Test Case Number and Title: **FUI-2040B - ECL Directives**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the ability of the user to build directives from the command line of the EOC user stations to support EOC operations. ECL directives will be issued from the ECL text field of the control window and the command line of the Command Control window, syntax will be checked, and the response message output and specific actions taken as a result of directive input will be verified by viewing response line and event display areas of the display screens. In cases where the FOS system functionality is not mature enough to completely execute a particular ECL directive, testing is performed to confirm that the ECL directive has been defined, can be entered and the syntax checked.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 14 August 1997; EOC - GSFC Building 32

Test Conduct Summary: All non-procedure type ECL directives were included in this test. (For procedure type ECL directives see test case FUI-2050B.) At least one variation of each directive was used.   First the directive would be entered with an intentional error to verify that the syntax was checked and then the error would be corrected and the directive entered for execution. Some valid entries in accordance with the Operations Tools Manual failed syntax check and the error was identified by the system; some entries received a syntax error notification but the error was not identified; some entries caused a syntax error, the error was identified, but when the correction was made another syntax error was given stating the correction was an error; and some entries gave no syntax error indication, but the directive did not appear to execute. These anomalies are recorded in NCR's 07617, 08105, 08345, 08353 and 08770.

Test Procedure Deviations: Steps 1 through 3 were not executed since the Data Server, Realtime Server, and the User Station were already initiated and the User Station was up with the Control Window displayed.

Steps 4 and 5 were skipped since User Authentication software had not been delivered in this release of the system.

Step 21: Had an operator error when entering sparc, spac was entered and the command was rejected. Had to reenter command.

Steps 37 and 38 were skipped because there are no derived mnemonics parameters defined in the database.

Step 40. Operator error. Entered a - instead of an = sign between STRING and 100. Re-entered command correctly.

Steps 65 thru 68. Replaced Event_Display with CODA-StatusBlocks.

Step 80. Operator error. Placed cursor in wrong place. Re-enterd command.

Steps 83 and 84. These steps were skipped. The ECL directive 'SH' is currently not accepted by the system.

Step 86. The BYE command was accepted from a syntax standpoint but, the function of taking down the User Station was not performed. 'MyKill' command in the xterm window was used to take down the User Station.

Steps 92 and 93. Steps were skipped. ECL directives are not accepted syntax wise.

Step 95. Received event messages in response to the ECL command entered. Messages were not included in the test procedure expected results.

Steps 100 thru 102 were deleted from the test case. These functions are verified in Test Case SYS-2020B.

Test Case Number and Title: **FUI-2050B - Procedure Builder**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test will verify the ability to create, syntax check, validate, check command constraints, edit, store, print, and delete ECL-based PROCs. The test begins with the initialization of the FOS-STS to support PROC processing. When the PROC Builder tool is invoked, the user can specify the PROC is to be generated according to a specified PROC type (e.g., emergency, command, ground, local, activity, and user-defined). The PROCs are saved by a specified spacecraft, instrument, or spacecraft-instrument name. The next set of steps involves the editing of several previously defined PROCs. Standard editing options will include cut, copy, paste, delete, insert (text or an existing Proc) , search/replace. The user will be able to manually enter commands as well as use the Directive Builder Tool. This procedure will also include the verification of various constructs and operator functions within a PROC. In addition, this test also ensures that the user receives a fail or pass status when syntax checking and validating the PROCs. Once the procedure has been successfully syntax checked an .xdr file is created, and placed in the users directory when the procedure is saved. The test will also ensure capability of producing a hard copy of the PROC(s).

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 27 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the users ability to build procedures containing conditional constructs; procedures containing nested conditional constructs; procedures containing iterative loops (while loop, until loop and for loop); and procedures containing nested loop constructs. It was successfully verified that the FOS allowed a procedure to reference telemetry parameters, specify temporary variables in a procedure, specify comments within a procedure, define labels within a procedure, specify a jump to a labeled statement, accept arguments when invoked, and use parenthesis to group arithmetic and logical operations. The procedure builder provides for built-in functions for use in a directive. It was successfully verified that the FOS provided the user the capability to create procedures; to edit existing procedures, including the editing capabilities of cut/copy/paste text, delete text, insert text, search for text strings, replace text strings and insert an existing procedure; to save procedures according to the procedure types of emergency, command, ground, local, activity and user-defined; to save a procedure according to its spacecraft identifier; to save a procedure according to it instrument identifier; and to identify the author of each procedure. The FOS verified that the procedure directives were consistent with the procedure type, except for user-defined procedures, when a save operation was attempted. It was verified that the FOS provided the user the capabilities to delete existing procedures, print existing procedures, and validate procedures. It was verified that the FOS provides the current syntax check status and the validation status; a list of directive keywords that the user may select from to build procedure directives; a list of directive keyword qualifiers corresponding to the selected keyword that the user may select from to build procedure directives; a list of mnemonics descriptors that the user may select from to build procedure directives; a list of mnemonic qualifiers that the user may select from to build procedure directives; and a set of current lim9t values that the user may select from to build procedure directives. It was verified that the FOS provided a user the capability to insert directive keywords, directive keyword qualifiers, mnemonics, mnemonic qualifiers(for mnemonics with discrete values), and limit identifiers(for mnemonics with analog values) into the procedure text.

It was partially verified that the FOS allows a user to specify values within a directive in decimal, hexadecimal, octal, binary, string, floating point, scientific notation, time and angles - See NCR 08662. It was partially verified that the FOS provides arithmetic and logical operators for use within procedures. The following operators were unverified:

! Logical NOT　　　　~ Bitwise compliment

<< Left Shift >> Right Shift

!= Inequality & Bitwise AND

// Concatenation　　　| Bitwise inclusive or

It was partially verified that a user had the capability to create procedures - see NCR 08662

It was partially verified that the FOS was capable of checking the syntax of a procedure - see NCR 08007

The FOS failed to validate each field of each real-time command in a procedure; to check real-time commands in a procedure against command-level constraints; to provide notification of command level constraint violations in command procedures; to allow "soft" command-level constraint violations to remain in a command procedure; and to prohibit "hard" command-level constraint violations remaining in a command procedure - see NCR 08655.

The FOS failed to allow a user to specify temporary variable arrays within a procedure - see NCR 08538

The FOS failed to provide a user the capability to print existing procedures - see NCR 08656.

Test Procedure Deviations:　　　.Steps 1, 2, and 3 were skipped since the Data Server, Real Time Server, and User Station were up.

Step 4. The Procedure Builder did not come up. Noticed the parameter server was down. This caused a recycle of the User Station. Procedure restarted at Step 3.

Steps 14 thru 18. The parser did not catch the fist two syntax errors.

Steps 20 and 21. Validation did not catch "hard" constraints.

Step 27. Procedure failed syntax check, but the syntax was visually verified to be correct.

Step 29. The procedure was saved but the .xdr file was not created, but it should not have since the procedure did not pass syntax check.

Step 65. Attempt to print procedure E2TBL16DG produced an event message saying 'print is successful' but no print was created.

Steps 91 and 93. Could not use variable arrays in the procedure. Would not pass syntax check.

Test Case Number and Title:	**FUI-2060B - Procedure Control & Execution**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the capability of the authorized users to execute procedures, suspend execution, resume execution, and terminate execution in accordance with system controls and restrictions. The test begins with bringing up a user station, attaching to the operational string and executing a local procedure, suspending the execution of the procedure, resuming the procedure. Multiple local procedures will then be executed simultaneously and one of the procedures will be terminated. Command type procedures and Ground type procedures will be executed. Required authority for these procedures will be verified, restrictions for execution will be verified and the capability to monitor procedure execution will be performed.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	29 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to allow a procedure to invoke other procedures; a user to terminate an executing procedure; a user to suspend an executing procedure; a user to resume a suspended procedure; and multiple local procedures to execute simultaneously. This test also verified that the FOS provided a display that allows a user to monitor the execution of a non-command procedure invoked from the user's workstation and a display that allows a user to control the execution of non-command procedure invoked from the user's workstation.

It was partially verified that the FOS allowed an authorized user to invoke a procedure at a specified time - see NCR's 08694 and 08317

The EOC was unable to transmit commands from a command procedure consisting of one or more commands and as a result of this it was not possible to verify that the EOC require a user authorization (allow or cancel) prior to uplinking a critical command from a command procedure - see NCR 08694.

The EOC allowed two ground system procedures to execute at the same time on the same logical string - see NCR 08692.

The EOC permitted a ground system procedure to be executed from the Command Control Window by a user that did not have Ground Control - see NCR 08693.

Test Procedure Deviations: Steps 1 and 2 were skipped. The Data and Real-time Servers were up and running.

Step 13. Procedure Local1 did not start. Selected Quit from the File pull-down menu. Added redline to 'Click on Auto button to step 13 and restarted procedure from Step 10. System functioned properly.

Steps 23 and 24. Steps were deleted from procedure. A predefined ground script is not needed for this test.

Step 25 failed. A procedure cannot be given a start time when started from the Command Line in the Command Control Window.

Step 26. Redlined step to take ground control away from the user.

Step 29. The system let two ground control procedures execute at the same time.

Step 32. The Procedure Control window design does not permit a start time to be specified for a procedure, but provides an ECL text field to insert ECL Directives. This step was modified to exercise the design and verify that a procedure can execute(invoke) another procedure.

Test Case Number and Title: **FUI-2080B - OASIS/CSTOL Conversion**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:	This test is designed to verify the ability to test the functionality of the CSTOL translators ability to convert OASIS directives into usable ECL directives. The test begins when a X-window is opened and the CSTOL translator utility is activated. The conversion is performed once to create a fully translated file. Following the successful completion of the first conversion, a second conversion will be performed to create another full conversion, (the difference being the input file was modified). Following the completion of the of second conversion a third conversion will be run. This file will also be modified to reflect directives that did not convert fully. Error messages will appear in the partially converted file.
Pass/Fail Assessment:	PASS
Date of Test:	30 July 1997; EOC - GSFC Building
Test Conduct Summary	This test successfully verified that the CSTOL translators were able to convert OASIS directives into usable ECL directives. The translator made two (2) successful full conversions and one (1) successful partial conversion. An error message was generated during the partial conversion that indicated not all directives fully converted. One NCR was written during this test. The error message displayed indicating a partial conversion states the directives flagged cannot be translated vice the directives flagged cannot be converted, NCR ECSed08048 (F-FUI-12800).
Test Procedure Deviations:	Two (2) deviations occurred during the test. Both Step 20 conversion had to be rerun due to typo in command line.
	Step 25 was repeated due to typo when creating file. The file name was typed as Tstinput_2 instead of Testinput_2.
Test Case Number and Title:	**FUI-2090B - User Authentication and Display**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary	This test case is designed to verify the ability of the FOS security login procedures to authenticate EOC users and for the EOC Manager to enter a list of authorized users and assign user type(s) (roles) to each user. The test begins with the initialization of the EOC to the point where the User login window is displayed on a CAC

authorized workstation. Both invalid and valid logins are performed, the user environments are selected to include system and standalone operations. User types are verified as well as the ability to switch to an alternate user type during a session. The capability of the EOC Manager to enter authorized EOC users/user type(s), delete authorized users/user type(s) and to change the user type(s) for users in the system.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 25 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the FOS requires unique sessions for each operator that accesses the FOS and a unique user identification and password for each individual user.

This test successfully verified that the FOS provides a login screen that allows a user to enter a user name and password; allows the user to specify a user type for the current login session; allows the user to have one or more user types; and allows a user to switch to an alternate user type during a session.

It was verified that the EOC Manager was provided the capability to enter a list of authorized EOC users, to delete EOC users from the system, and to change the user types for EOC users in the system.

During the conduct of the test case, it was shown that entering an invalid user_id of password followed by a valid user_id and password would cause the FOS Login window to crash - see NCR 08512.

During the test it was shown that user roles are not, in general, enforced by the system - see NCR 08513.

A STRING DICSONNECT STRING=100 directive was entered when the user was not connected to the string. An event message was issued indicating the user was successfully disconnected from string 100 - see NCR 08626.

Test Procedure Deviations: Steps 1 and 2 skipped since Data and Real-time Servers were already up.

Step 6. Redline to correct 'Closer' to 'Close'.

Step 7. Step caused the FOS Login window to crash. Known problem. Restarted FOS Login window prior to Step 9..

Step 12. Redline procedure to add step to select EOC as the Site.

Step 15. Redlined procedure to change Genric User to Read Only and Changed Control Window-Room Main to Room SystemRoom1.

Step 17. ECL directive BYE is not functional. Used MyKill as a workaround to take down the User Station.

Step 19. Redlined procedure to add % test prior to %: FOS_LOGIN to put system in proper directory prior to entering FOS_LOGIN.

Step 20. Add redline to close error dialog window.

Step 26. Redline to chang -RoomMain to -RoomSystemRoom1.

Step 33. Same as Step 17.

Step 36. Redline add Unix command % test and % FOS_LOGIN prior to User>jdoe

Step 40. Redline procedure response message to 'Must be connected as Mirrored before requesting ground control authority'.

Step 41. User was not connected to string 100. Message should have indicated 'User not connected'.

Step 42. Same as Step 17.

Test Case Number and Title:	**FUI-2100B - Room Builder**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to manage the EOC user station desktop environment via the use of rooms and windows. The test begins with the initialization of the EOC. All default rooms are invoked and it is verified that these rooms match the user's default room assignment. A room is created by use of the Room Builder tool. Windows are added and deleted dynamically, repositioned within the displayed room, and re-sized to overlap one another. The room created is

saved and the defined room is then re-entered by the same user to ensure that the previously saved room definitions are available.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 29 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test case successfully verified that the FOS provided access to all room definitions in the system; the capability to define a room; the capability to modify a room; the capability to define the default position and size of each of the windows in a room; the capability to define the tiled position and size of each of the windows in a room; the capability to add windows to a room dynamically; to delete windows from a room dynamically; the capability to switch from one room to another dynamically; the capability to dynamically reposition windows in a room; and the capability to dynamically resize windows in a room.

It was also successfully verified that the FOS allows a window to belong to more than one room; allows windows to overlap each other; and allows a window to have a name.

This test case partially verified that the FOS allows a room to consist of 0 to 12 windows, with their respective sizes and positions in their default, tiled and user modified state.

It was also partially verified that FOS provided the capability for a user to dynamically switch between room states.

The FOS was unable to save a room in a permanent state and as a result of this it was not able to verify that a room could be deleted - see NCR's 08614, 08671, and 08654.

Test Procedure Deviations: Steps 1 and 2 were skipped since the Data and Real-time Servers were already up.

Step 13. Added redline to connect to string 100.

Step 15. After Header page was selected the support LAN file server quit responding. Ops is recycling file server and test will continue. File server problem was not due to this test. Header now appears in the

Rooms...dialog box. Redlined Header in this step to read TLM2020B.

Step 16. Due to the problem with saving a room as permanent, a workaround was implemented saving the room as 'Temporary'.

Step 22. Step failed to change the room to the default configuration defined earlier in the test.

Step 23. To continue test, brought up MyNewRoom from the Rooms dialog box.

Step 31. Due to noise interference from the intercom box, failed to click OK. Repeated Step 31 after Step 32. Does not change the integrity of the test.

Step 58. Redlined step to add CODA- in front of Header.

Step 61. Work around implemented to avoid crashing workstation. Permanent save to temporary.

Step 63. Added a string disconnect from string 100 before doing the MyKill in Step 64.

Step 67. Changed the user role from Operations Controller to Generic User as part of the work around.

Test Case Number and Title:	**FUI-2110B - Display Builder (Graphs and Tables)**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to create a Graph and Table with Display Builder. The user will be able to build and customize a real time graph that will display mnemonic values in several different formats from incoming telemetry data via a test driver. In the second portion of the test the user will be able to create a table that displays 50 telemetry values and demonstrates the capability to hold at least 300 rows of data before it starts to rollover.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	8 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to create a Graph and Table with Display Builder. The ability to build and customize a real time graph that displayed mnemonic values in several different formats

from incoming telemetry data via a test driver was not verified. In the second portion of the test the ability to create a table that displays 50 telemetry values was demonstrated but capability to hold at least 300 rows of data before it starts to rollover was unverified because the table stopped updating with data. NCR's written, 08367, 08316, 08314, 08364, 08362, 08361, 07398, 08305, 08375, 08781.

Test Procedure Deviations: Step 22 relined item #4 and added 'GRAPH'.

Step 33 changed x-axis to 'CDH_BR_SFEALPCMDREJ and added in the comments 'Mnemonic against mnemonic graph is displayed'.

Step 51 added 'Setenv SCRIPT UserStation'. Added "Min, Max values are displayed in display window"

Step 54 added "Snapshot screen appears to indicate printers" and "Printer destination".

Step 55 added "Setenv SCRIPT UserStation".

Step 61 deleted items 8 and 9 and AM1_SDU.

Step 62 did 23 instead of 22 for a total of 26.

Step 70 changed apply to OK.

Step 71 table did not up correctly.

Step 79 changed Apply to OK.

Step 81 Table did not update correctly and descriptor not displayed.

Test Case Number and Title: **FUI-2115B - RTWORKS (Schematic)**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the capability of the COTS product RTWorks to build and display schematic drawings of telemetry points that are contained within the FOS software. The user will start the test by creating a template of their desired drawing, then they will save the drawing and then reopen it with a Rtdisplay tool., once reopened the user will insert their preferred parameters of choice within the drawing and then re-save the drawing. In the last portion of the test the user will run a telemetry driver that will create data that will be picked up by the

parameters within the schematic display created by the user.

Pass/Fail Assessment: PASS

Date of Test: 16 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the capability of the COTS product RTWorks to build and display schematic drawings of telemetry points that are contained within the FOS software. The capability to create a template of their desired drawing, then they saved the drawing and then reopened it with a Rtdisplay tool., once reopened the user inserted their preferred parameters of choice within the drawing and then re-saved the drawing. In the last portion of the test the user ran a telemetry driver that created data that was picked up by the parameters within the schematic display created by the user.

Test Procedure Deviations: At step 13 two snaps were taken.

Test Case Number and Title: **FUI-2120B - Document Reader**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the FOS capability to browse on-line documentation, search on-line documentation, manipulate on-line documentation, cancel on-line documentation request, open one or more document readers, provide a history trace window, provide a process to clear the history window, provide a process to update a document, provide a process to delete a document, and a process to input a document.

Pass/Fail Assessment: PASS

Date of Test: 8 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the capability to browse on-line documentation, search on-line documentation, manipulate on-line documentation, cancel on-line documentation request, open one or more document readers, provide a history trace window, provide a process to clear the history window, provide a process to update a document, provide a process to delete a document, and a process to input a document. While connecting to http://edhs1.gsfc.nasa.gov was taking a long time.

Test Procedure Deviations:	None.
Test Case Number and Title:	**FUI-2130B - E-Mail**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to e-mail. The test starts with the activation of the e-mail software at the UserStation and then flows into the verification of e-mail requirements.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	12 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to e-mail. The test started with the activation of the e-mail software at the UserStation and then flowed into the verification of e-mail requirements. NCRs written, 08378 and 08381 and step number 19 was unable to demonstrate items c, d and e.
Test Procedure Deviations:	Step 10 item 4 changed the title.
Test Case Number and Title:	**FUI-2140B - Quick Message Generator**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to display 'quick messages' in the events display . The test begins with the initialization of the EOC and the display of the event display. The Quick Message display is selected from the Tools menu and the Quick Message dialog window is displayed at the UserStation. The dialog window is manipulated to functionally use the To, Severity, and Text box option, and also the send, cancel, and help functions.
Pass/Fail Assessment:	PASS
Date of Test:	2 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to display 'quick messages' in the events display . The Quick Message displayed was selected from the Tools menu and the Quick Message dialog. The dialog window was manipulated to functionally use the To, Severity, and

Text box option, and also the send, cancel, and help functions.

Test Procedure Deviations: None.

Test Case Number and Title: **FUI-2150B - On-Line Help**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the capability to display windows that have a HELP function/button . The user then selects the HELP function/button and navigates through the HELP menu/options that are available to them for that specific FOS display window.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 23 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the capability to display windows that have a HELP function/button. The capability to select the HELP function/button and navigate through the HELP menu/options were available to specific FOS display window. Document reader was not configured for, e-mail has no help, schematic display did not come up and table load builder produced table load builder messages on the events display page. NCRs written, 08546 and 08541.

Test Procedure Deviations: At step 13 chose Command Control instead of Room Builder.

At step 15 chose Command Control instead of Room Builder.

At step 16 chose ground instead of dynamic.

At step 17 chose Command instead of Room.

At step 18 chose Command instead of Room.

At step 19 changed minimize to directives.

After step 22 add quit from the Display Builder pages and Quit from the Command Control page.

3.3.2.8 Events Test Group

This section presents the detailed result information for test EVT-2000B (Event Message Display & Graphical Timeline, EVT-2010B (Event Message Filtering), EVT-2020B (Event History Request & Reporting), EVT-2030B (Alarm Message-Handling)

Test Case Number and Title:	**EVT-2000B - Event Message Display & Event Graphical Timeline**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test successfully verified the FOS capability to display generated event messages at the EOC UserStations utilizing event message display options supplied by the FOS user interface. The test begins with the initialization of the EOC and the display of the event graphic timeline, both the Local and Global. The event message generator is invoked, multicasting event messages for display. The graphicical event timeline functionality is then verified, including event message formatting, timeline indicators, time correlated visual indicators, and event message selection/graphical timeline interaction.
Pass/Fail Assessment:	PASS
Date of Test:	31 July1997; EOC - GSFC Building 32
Test Conduct Summary:	This test is designed to verify the FOS capability to display generated event messages at the EOC UserStations utilizing event message display options supplied by the FOS user interface. We were able to display the event graphic timeline both Local and Global. The event message generator was invoked muticasting evnet messages for display. The event timeline functionality was verified including the message formatting, timeline indicators, visual indicators and event message selection/graphical timeline interaction.
Test Procedure Deviations:	Step 4 was redlined to reflect 'Event Display-Global'
	Step 5 was redlined to reflect 'Event Display-Local'.
Test Case Number and Title:	**EVT-2010B - Event Message Filtering**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability of the Global and Local event displays to filter on specific attributes. The test begins with the initialization of the EOC and the display of both displays. The event driver is then invoked, multicasting messages to the UserStation for display. The event filtering scenarios are then

implemented by selecting, deselecting attributes through filtering options.

Pass/Fail Assessment:	PASS
Date of Test:	2 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability of the Global event displays to filter on specific attributes. We were able to display both Local and Global event display but no local event messages were displayed on the Local display once the FdEventDriver was executed. NCR 08292.
Test Procedure Deviations:	Step 4 was redlined to reflect 'Event Display-Global'
	Step 5 was redlined to reflect 'Event Display-Local'.
Test Case Number and Title:	**EVT-2020B - Event History Request & Reporting**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to retrieve all event messages, from the event acrchive, by specifying start/stop time, event type, event identified, spacecraft identifier and instrument identifier. This test will also verify the ability to filter retrieved events according to time, event types, event identifiers, spacecraft identifiers and instrument identifiers. The events in the archive are retrieved and viewed through the use of Netscape.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	7 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to retrieve all event messages, from the event acrchive, by specifying start/stop time, event type, event identified, spacecraft identifier and instrument identifier. This test also verified the ability to filter retrieved events according to time, event types, event identifiers, spacecraft identifiers and instrument identifiers. The events in the archive were retrieved and viewed through the use of Netscape. Wrote an NCR during testing: Need 7 Days of Netscape. There should be the capability to archive events for at least 7 days (NCR 08524). The

	database was short 5 days and we needed to wait until 8/12/97 to verify the capability.
Test Procedure Deviations:	Netscape 'hung' during step #9
Test Case Number and Title:	**EVT-2030B - Alarm Message Handling**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to designate and acknowledge messages as, Info, Warning, Alarm, and Fatal. The test begins with the start-up of the EOC, the generation of messages. The FOS software is designed to acknowledge messages of the 'alarm' severity by pressing a 'ACK' button in the Environment Control window, the other types of messages do not require a response.
Pass/Fail Assessment:	PASS
Date of Test:	2 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the FOS capability to designate and acknowledge messages as, Info, Warning, Alarm, and Fatal. Also, the generation of messages was successful. The software acknowledged messages of the 'alarm' severity when the 'ACK' button in the Environment Control window was pressed. An NCR was written against requirement number F-FUI-09650. During the testing we noticed that the alarm messages acknowledged in the display bid not appear as acknowledged in the Events History Display through Netscape. NCRs 08291, 07766.
Test Procedure Deviations:	Step 16 was noted to be where the alarm message was not found through the Events History Display through Netscape.

3.3.2.9 Operations Test Group

This section presents the detailed result information for test HRD-2000B (EOC Hardware), and OPR-2000B (Functional Requirements Analysis.

Test Case Number and Title:	**HRD-2000B - Hardware**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that the FOS hardware components located at the EOC met the performance and standards specified by the aggregate set of hardware requirements.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 28 & 29 July 1997; EOC - GSFC Building 32

Test Conduct Summary This test verified that the FOS hardware components located at the EOC met the majority of the performance and standards specified by the aggregate set of hardware requirements. In most cases, inspection of the hardware requirements (i.e. hardware specifications, drawings, etc.) was used to verify the requirements. When documentation was lacking, verification was performed via demonstration. The majority of the objectives were satisfied. Four (4) NCRs were written during this test. Partially satisfied objectives include: display pages are readable from any location; NCR ECSed07527 (F-HRD-01015 step f), The RAID shall be network attached or hosted to a minimum of 2 front-end processors; NCR ECSed08043 (F-HRD-03040), there shall be at least one counter up, down counter and universal time code display in the EOC; NCR ECSed08046 (F-HRD-05025), the EOC shall provide 36 User Stations, which can perform any EOC subsystem function; NCR ECSed07312 (F-HRD-07010). Other discrepancies included: Realtime server bobcat was configured to the ops lan vice support lan, Realtime server puma was configured to the support lan vice ops lan, Data server panther was configured to the ops lan vice support lan, and Data server jaguar was configured to the support lan vice the ops lan. The server reconfigurations be due to concurrent running of another test.

Test Procedure Deviations: Five (5) deviations occurred during the test.

Step 33, the systems administrator entered "console -c3" to activate the screen that displayed the RAID icons.

Step 34, device names for cougars should be re0 and rz3.

Between steps 34 & 35 insert step that will read "Repeat twice more to verify the other two Raid servers".

Step 45 "df -k" command should be changed to "format" command. "format" can only be done by system administrator, need to be root.

Step 41 needs to be changed to reflect the system administrator checking the /var/adm/message file on the RAIDs.

Between steps 53 & 54 insert steps to bring up a User Station and display alphanumeric page.

Test Case Number and Title:	**OPR-2000B - Functional Requirements Analysis**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test verifies functional requirements that are met through documents and procedures of design, management, and operation.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	21 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified 21 of 28 requirements. Three of the eight requirements were partially satisfied in release B. The remaining five requirements were unverified due to Post-B activities. The following NCR's were written: ECSed08526, ECSed08527, ECSed08528, ECSed08529, ECSed08530, ECSed08532, ECSed08533, ECSed08584
Test Procedure Deviations:	None

3.3.2.10   External Interface Test Group

This section presents the detailed result information for test ASTR-2000B (ASTER Scheduling & IST Access), EDOS-2000B (CODA Receipt and Processing), EDOS-2030B (Receive and Forward Trash Buffer Data), FDF-2000B (FDF Product Receipt), NCC-2020B (NCC GCMR Processing), NCC-2030 (Request/Analyze User Performance Data), and SAS-2000B (Remote Access and Carry-Out File Transfer)

Test Case Number/Title:	**ASTR-2000B - ASTER Interface**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the EOC capability to perform ASTER scheduling. The ASTER schedules are received from the simulated AOS at the simulated IST and checked for constraint violations. The EOC (ASTER

IST) responds to STSs with the correct PRSs including constraint records. The EOC responds to ODSs with the correct ACSs including constraint records.

Pass/Fail Assessment: Partial PASS

Date of Test: 21 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified that the ASTER STSs and ODSs are received and constraint checked by the EOC in the schedule and analysis modes. STSs are responded to with PRSs. ODSs are responded to with ACSs. In the schedule mode, an STS or ODS with no activities results in deleted activities on resources between start and stop times on the Master Plan. In the analysis mode, an STS or ODS with no activities results in deleted activities on resources between start and stop times on the analysis what-if plan.

An NCR (ECSed08545) was written during verification of the output files after the AT. It was written against the PRS and ACS formats which do not comply with the ASTER ICD and caused the requirement F-PAS-10305 to fail.

Test Procedure Deviations: Step 24 - After system hung and backup again,   plan 2 was opened and closed.

Step 41 - FTP timeout. Beeper was opened to ftp the test files.

Step 47 - Operator error, : was not included.

Step 58 - System slowed down. 'Plan' was clicked on and 'Master Plan' was selected. The status of all current processes was checked.

Step 62 - FTP timeout. Beeper was opened to ftp the test files.

Step 103 - Operator error, an incorrect file was selected to ftp.

Test Case Number and Title: **EDOS-2000B - CODA Receipt and Processing**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify that the EOC can receive, archive, and process real-time CODA reports. Following

initialization of FOS servers, the user logs in to an EOC user station, brings up the Event Display, connects to a real-time logical string, and brings up CODA Report display pages. The user logs in to the Real-Time Server and invokes the CODA Report generator, which sends valid and invalid CODA reports to the EOC. As the CODA reports are processed, parameter values are automatically updated in the CODA Report display pages. Event messages are generated for invalid CODA Reports. A comparison is made between the CODA Report data generated and displayed. The CODA Report generator is terminated, and the CODA Report archive is checked for the presence of the CODA reports just received.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 25 August 1997; EOC - GSFC Building 32

Test Conduct Summary: This test successfully verified the capability to receive and archive real-time CODA reports. CODA parameter values were successfully displayed on pre-built alphanumeric display pages. The processing of CODA reports was generally successful except that the FgEiEdosIn process terminated when certain CODA data was being processed (NCR 07734). CODA reports containing incorrect header information resulted in appropriate event messages, although no event message was generated for an incorrect message length (NCR 08625).

Test Procedure Deviations: Following Step 36, additional CODA testing was conducted, this time with EDOS. This entailed creating, then connecting to, a Real-Time Test logical string (String 101); coordinating with EDOS to send CODA reports; and receiving, processing, and archiving the CODA reports. EDOS sent empty blocks at first. Some of the follow-on EDOS CODA reports contained incorrect data field offsets, which caused the FgEiEdosIn process and String 101 to fail. The Environment Controller process terminated. The user station was rebooted and the test resumed using the internal CODA generator as described in test procedure EDOS-2000B. (Note: Testing CODA reports using EDOS is not included in this CODA test procedure, since the test was

designed to use the internal CODA generator only without using EDOS.)

After Step 45, an option was added to change the Message Type to an Operational CODA Report.

Test Case Number and Title:	**EDOS-2030B - Receive and Forward Trash Buffer Data**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify that the EOC can receive Trash Buffer data from EDOS, archive these data, and send the data to SAS and SDVF (SDF IST/FSTB). Following initialization of the FOS Data Server and EOC user station, the user brings up the Event Display. The user logs in to an emulated EDOS and accesses the Trash Buffer data file. The Trash Buffer data file and its associated signal file is sent from EDOS to the EOC via FTP. An event message appears on the EOC user station indicating receipt of these data, which are automatically archived at the EOC. The user accesses the Trash Buffer data file just archived and sends it to the SAS and SDVF (SDF IST/FSTB) workstation via FTP.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	15 August 1997 (First Formal Run)/22 August 1997 (Retest); EOC - GSFC Building 32
Test Conduct Summary:	**First Formal Run**: This test successfully verified the capability to transfer Trash Buffer data files to the SAS and SDVF (SDF IST/FSTB). The capability to display an event message upon Trash Buffer data receipt was not verified (NCR 08255). There was no capability to archive Trash Buffer data (NCR 08473).
	Retest: This test successfully verified the capability to display an event message upon Trash Buffer data receipt; to list Trash Buffer data files; and to transfer them to the SAS and SDVF (SDF IST/FSTB). An event message was displayed upon receiving these data, but this message was repeated for each cycle of the FdFwFileWatcher process (NCR 08674). Misleading event messages indicating script execution for Trash Buffer data were also displayed (NCR 08675). The Trash Buffer data is not archived in the proper directory (NCR 08657).

During a dry run of this Trash Buffer data test procedure (EDOS-2030B) on the Support LAN, the FdFwFileWatcher process exited on failure (NCR 08677).

Test Procedure Deviations:	**First Formal Run and Retest:**
	Optional Step 3 was not executed.
	A workaround was used in Step 17 to change the working directory on the EOC user station to the directory where the Trash Buffer data was received.
Test Case Number and Title:	**FDF-2000B - FDF Product Receipt**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS capability to receive, ingest, validate, and process FDD products. This test demonstrates that a user is able to receive FDD products via FTP from a FDD workstation. Upon receipt, products are validated and ingested into the operational database. Processing of the FDD data includes: scheduling of select FDD planning aid products on the PAS timeline, analysis of select FDD products, dataset generation of select FDD products, table load generation of FDD tableload products and transfer of select FDD products to the Instrument Teams and to the DAAC.
	The test was divided into eight (8) sections: Product Receipt and Validation, Update PAS Timeline, Generate Statistics, Generate Datasets, FDF Table Load Generation, Distribution to IST, Distribution to ASTER, and Data Archival.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	31 August 1997, 12:40am; EOC - GSFC Building 32
Test Conduct Summary:	This test partially verified the FOS capability to receive, ingest, validate, and process FDD products. Section One (1) of the test consisted of product receipt and validation. The user was able to ingest all of the available FDD products. Not all of the products listed in the FDD ICD were available for the test. A file with numerous errors failed validation but the test was unsuccessful in generating a validation report. Section Two (2) of the test consisted of updating the PAS timeline. This section of

the test was partially verified because some of the PAS events were displayed on the timeline. Not all of the events were displayed on the timeline due to the unavailability of the products. Section Three (3) of the test consisted of dataset generation. This section of the test failed verification because the dataset file was not generated. Section Four (4) of the test consisted of the statistics generation. This section of the test failed verification because the statistics file was not generated. Section Five (5) of the test consisted of Table Load Generation. This section of the test was successfully verified. Section Six (6) of the test consisted of distribution to the IST. This section of the test failed verification because the PAS events were not displayed on the IST timeline. Section Seven (7) of the test consisted of distribution to ASTER. This section of the test failed verification because the ASTER directory was not configured. Section Eight (8) of the test consisted of data archival. This section of the test was successfully verified.

NCRs generated during this test: 08762, 08758, 08757, 08756, 08755, 08754, 08753.

Test Procedure Deviations:

Step 15 was redlined to include a UNIX directory listing.

Step 16 was redlined to correct the directory structure and include a step for the user to input the username and password.

Step 17 was redlined to correct the directory structure for the UNIX script.

Step 19 was redlined to include what the user should expect when the process was killed.

Step 21 was redlined to correct the directory structure for the error file. There was a deviation for this step. The user had to go to the directory before FTP.

Step 23 was redlined to include the name of the directory.

Step 27 was redlined to select the bookmark rather than type in the http address.

Deviation - Step 32-37 was not executed because the FDF Validation Report was not generated.

Deviation - Step 61 was not executed because the ASTER directory was not configured for the test.

Step 62 was redlined to correct the directory.

Step 63 was redlines to include a step to go to the archive directory and verify the contents.

Test Case Number and Title:	**NCC-2020B - NCC GCMR Processing**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to send various Ground Configuration Message Requests (GCMR's) to the NCC dummy emulator, and process GCM Status and GCM Disposition messages received as a result of the NCC dummy emulators response to the ground configuration requests.
Pass/Fail Assessment:	PASS
Date of Test:	23 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the ability to send various Ground Configuration Message Requests (GCMR's) to the NCC dummy emulator, and process GCM Status and GCM Disposition messages received as a result of the NCC dummy emulators response to the ground configuration requests.
Test Procedure Deviations:	Step 8 changed to 'GCMR COMMTEST MSG is sent to NCC GCMR'
	Step 11 change to 'Communication test message directive is sent to NCC UPD services'.
	Step 16 change 1 to 5 and 2 to 6.
	Step 19 change 3 to 7 and 4 to 8.
	Step 21 change 5 to 9 and 6 to 10.
	Step 23 change 7 to 11 and 8 to 12.
	Step 25 change 9 to 13 and 10 to 14 and add Link=SSA1 after forward and SSA after reconfig.

Test Case Number and Title:	**NCC-2030B - Request and Receive User Performance Data (UPD)**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test case is designed to verify the capability of the FOS software to send User Performance Data (UPD) request messages to the NCC, Ingest UPD data into the Database, Demonstrate the capability to replay stored NCC UPD's data for a specific time period, the capability to process all data for time requested, the ability to process requested data between 3 to 12 times the real-time captured rate, the capability to perform Max, Min, and Mean (MMM) stats on UPD.
Pass/Fail Assessment:	PASS
Date of Test:	24 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the ability of the FOS software to send User Performance Data (UPD) request messages to the NCC, Ingest UPD data into the Database, Demonstrate the capability to replay stored NCC UPD's data for a specific time period, the capability to process all data for time requested, the ability to process requested data between 3 to 12 times the real-time captured rate, the capability to perform Max, Min, and Mean (MMM) stats on UPD. After step 19 had to stop because the executed result did not occur. Two UPD drivers were running and one had to be killed.
Test Procedure Deviations:	Step 10 add 'or type test for alias and type bin for alias.
	Step 14 add 'Enter destination string ID=100' and Enter destination host=VIPER'.
	Step 16 change 0000001 to 0000002.
	Step 17 change 0000002 to 0000003.
	Step 23 change 0000001 to 0000003
	Step 24 change xxxxxx to 0000004
	Step 25 add 'take two snaps by using the snap utility'
	After step 26 add step 15

	After step 30 add 'Enter destination string ID=100' and 'Enter destination host name=bee'.
Test Case Number and Title:	**SAS-2000B - Remote Access and Carry-Out File Transfer**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify that an EOC user can remotely access RTADS, SAS, and SSIM data and send a carry-out file from the EOC to SAS. An EOC user Telnets to the emulated RTADS/SAS/SSIM server. The user then accesses emulated RTADS/SAS/SSIM server data, which appears on the EOC user station. The EOC user accesses an existing EOC carry-out file, which is sent to the SAS workstation using FTP.
Pass/Fail Assessment:	PASS
Date of Test:	29 July 1997; EOC - GSFC Building 32
Test Conduct Summary:	This test successfully verified the capability for an EOC user to Telnet to the emulated RTADS/SAS/SSIM server from an EOC user station and access emulated RTADS/SAS/SSIM data. The EOC user was able to send a carry-out file to the emulated SAS.
Test Procedure Deviations:	In Step 14, no file list was received from FTP. Quit out of FTP, re-entered FTP, and the file list was promptly displayed. (This was an FTP-related glitch and was not FOS-related.)

3.3.2.11   Planning and Scheduling Test Group

This section presents the detailed result information for test PAS-2000B (Activity Definer Tool (PAS-2000B), PAS-2010B (BAP Definer Tool), PAS-2020 (General Scheduler), PAS-2030B (EOC Timeline-Display & Manipulation), PAS-2035 (EOC-Timeline Management), PAS-2040 (Contact Schedule), PAS-2050B (Activity Constraint Definition), PAS-2110B (Scheduling Load Uplink Activities), PAS-2180B (Receive and Schedule Late Change Requests, PAS-2190 (What If Planning & Scheduling), and PAS-2200 (DAS Generation).

Test Case Number and Title:	**PAS-2000B - Activity Definer Tool**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test verifies the Planning & Scheduling (PAS) subsystem capability to support the generation of activity definitions via the Activity Definer Tool. Performing this test demonstrates that the Activity Definer Tool allows a

user to create a new activity for a given spacecraft subsystem or instrument. For the newly created activity, the user is able to specify: commands to be incorporated, relative times for the commands, modifications to associated command parameters, and mode transitions that occur during activity execution. In addition, the user is able to incorporate complex activities, ECL directives and ground procedures into the activity. Once the activity has been created, this test demonstrates that the user is able to save the activity, open the activity, make modifications to command and procedure parameters, save the activity under a different name using the 'save as' option, and delete the activity from the pool of available activities. Permissions to access the activity by unauthorized users is tested as well.

Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	31 July 1997; EOC - GSFC Building 32

Test Conduct Summary: The user was able to create an activity for a given spacecraft subsystem and instrument. The user was able to include in the activity, an associated command sequence with relative times and parameters, modes transitions, ECL directives, ground procedures, complex activities, and scheduling information. User defined parameters were modified for commands. The user was unable to insert ground procedures with parameters. Once the activity has been defined, the user was able to execute the following options; Save, Save As, Open, Close, Delete and Exit. The permissions associated with the activity was verified through an unauthorized user, ASTER Scheduler.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell

prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %:source UserStationStartup.pas

Steps 4-5: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 74: Inserting a ground procedure with parameters into the Activity Definer core dumps the tool.

Step 76: The Activity Definer Tool was started at a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

    %:   setenv SCRIPT UserStation

    %:   source FosEnvVars

    %:   st_ad

Steps 88-91: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variables so activities could be saved in the Operational environment and user role would be an ASTER scheduler..

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

setenv USERROLE ASTERScheduler

The User Station was up before the start of the test. The startup was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

User Station -   %: source UserStationStartup.pas

There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

| **Test Case Number and Title:** | **PAS-2010B - BAP Definer Tool** |
| **Reference to Test Documentation:** | FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002) |

Test Summary: This test verifies the FOS Planning & Scheduling (PAS) subsystem capability to support the generation of Baseline Activity Profile (BAP) definitions via the use of the BAP Definer Tool. Performing this test demonstrates that the BAP Definer Tool allows a user to create a new BAP definition for a given spacecraft subsystem or instrument. Creating a BAP allows the user to schedule a repetitive sequence of activities that define the normal operations for the instrument or subsystem. The test will demonstrate the ability to specify: valid activities for incorporation, modifications to associated command parameters and ground procedure parameters, and modifications to off-set times associated with the activities. The test will show the capability to save, close, open, save as another name, and delete a BAP.

Pass/Fail Assessment: PARTIAL PASS

Date of Test: 31 July 1997; EOC - GSFC Building 32

Test Conduct Summary: Through the use of the BAP Definer Tool, an authorized user was able to create a BAP for a selected spacecraft subsystem and instrument. The user was able to include in the BAP a defined activity sequence with off-set times. User defined parameters were modified for commands. The user defined parameters were modified for ground procedures. There was no capability to save ground procedures within an activity definition. Once the BAP was defined, the user was able to execute the following options; Save, Save As, Open, Close, Delete and Exit. The permissions associated with the BAP were verified through an unauthorized user.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell

prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %:source UserStationStartup.pas

Steps 4-5: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 47: The system will not allow a user to delete a BAP unless it is open. Therefore, the BAP was opened before it was deleted.

Steps 52-55: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variables so activities could be saved in the Operational environment and user role would be an ASTER scheduler.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

setenv USERROLE ASTERScheduler

The User Station was up before the start of the test. The startup was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

User Station -   %:source UserStationStartup.pas

There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Test Case Number and Title:	**PAS-2020B - General Scheduler**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the Planning & Scheduling (PAS) capability to support the scheduling of activities, BAP's, commands, and procedures on the mission timeline. Upon successful initialization of the General Scheduler window and EOS Timeline window the test demonstrates the capability to schedule activities against the timeline on an impact, no impact and over subscription basis. Scheduling in reference to time and

events is demonstrated as well. Error handling is also tested through command parameter value changes and scheduling conflicts.

Pass/Fail Assessment: PASS

Date of Test: 4 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The test was successful when the user was able to schedule activities, BAP's, commands and procedures against the master plan of the mission timeline. Scheduling was conducted in impact, non-impact and over subscribe modes. The oversubscribed activity was placed in the background instead of the foreground. The status information of the oversubscribed activity did not appear in the status bar upon selection. The user should was able to unschedule activities from the timeline and produce a list of such activities. The following NCR's were written: ECSed08190 and ECSed08191.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Steps 7-8: Change EOC Timeline to EOS Timeline.

Step 14: Change Edit to Modify.

Step 21: Change S/C Day to S/C Day/Night

Step 24: Remove the 's' on Minutes.

Steps 31-32: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Steps 38-43: Remove the steps.

Step 45: Add a step to select 'Yes' within the Confirm dialog box.

Step 55: Add the selection of S/C Day/Night.

Step 57: Add a step to open the Parameter dialog box.

Step 61: Modify text to say S/C Day/Night and S/C Night/Day.

Step 65: Add a step to select 'Yes' within the Confirm dialog box.

Test Case Number and Title:	**PAS-2030B - EOC Timeline - Display & Manipulation**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the Planning & Scheduling (PAS) capability to display activities, events, and resources on the mission timeline. The test will demonstrate the ability to display and manipulate information for the user. Editing the configuration, scrolling by time and resource, printing, and altering the colors will be tested.
Pass/Fail Assessment:	PASS
Date of Test:	4 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The test was successful when the user was able to display activities and events with their associated detailed information. The user manipulated the configuration, viewing area, and display colors. The user was unable to generate a text report print through the use of the FUI Report Generator Tool. A workaround was used instead. The following NCR was written: Ecsed08026.
Test Procedure Deviations:	Deviations and workarounds consisted of the following:
	System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file

contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 14: Used the horizontal and vertical scroll bars.

Step 17: Insert a step to select the activity and click 'OK' to close the dialog box.

Step 24: Change 'Resource' to 'Sub-regions'.

Step 26: Change 'Resource' to 'Sub-regions'.

Step 28: Change 'TBD' to 'Activity'

Step 29: Insert a step to scroll to the bottom of the display to verify new resource.

Step 36: Delete the word 'Changer'.

Step 41: Workaround was used to print the text report. The Report Printing Tool was started at a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

    %:   setenv SCRIPT UserStation

    %:   source FosEnvVars

    %:   st_rp -schedule -start 1997:217:00:00:00

          -stop 1997:218:00:00:00

Test Case Number and Title:	**PAS-2035 - EOC Timeline - Management**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test will begin with the creation of scheduling plans and multiple timelines. The test will demonstrate the viewing options, saving capabilities and deleting functions. Permissions for scheduling to a resource and deleting a plan and activity is covered as well. The test will move into the cut/copy/paste functionality across plans as well.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	7 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The user successfully managed multiple plans at one time; set up user permissions in accordance to resources and ownership; and demonstrated the basic functionality with editing (cutting/copying/pasting) activities within a plan and across plans. The timeline crashed during the operation of closing a plan on one account. The user was also able to schedule activities on a resource in which permission was not assigned. The following NCR's were written: Ecsed08536 and Ecsed08537.
Test Procedure Deviations:	Deviations and workarounds consisted of the following:
	System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.
	echo "Allowing Activity Definitions during OPS"
	setenv PASMODE TEST
	Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:
	Data Server - %: source DataServerStartup
	Real-Time Server - %:source RealTimeServerStartup
	User Station - %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 14: There is no FUI/PAS interface therefore, the PAS tools are started using the following commands from the /fosb/test/am1/scripts/setup/ directory:

    %:   setenv SCRIPT UserStation

    %:   source FosEnvVars

    %:   st_tl

Step 15: The system was moving slow and the test was restarted at this point. The Data Server and User Station was recycled.

Step 22: There was an operator error. The timeline day should be opened for day 174 on timeline 2 - Master Plan:3.

Step 23: This step was accomplished with step 22 workaround to adjust for operator error.

Step 26: The timeline crashed after selecting the Yes button. The timeline was restarted. There is no FUI/PAS interface therefore, the PAS tools are started using the following commands from the /fosb/test/am1/scripts/ setup/ directory:

    %:   setenv SCRIPT UserStation

    %:   source FosEnvVars

    %:   st_tl

Step 55: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variables so activities could be saved in the Operational environment and user role would be an ASTER scheduler..

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

setenv USERROLE MISRScheduler

The User Station was up before the start of the test. The startup was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/ setup/ directory:

User Station -   %: source UserStationStartup.pas

There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 62: No error dialog box. I was able to schedule on the MISR resource.

Test Case Number and Title:	**PAS-2040 - Contact Scheduler**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	Test support consists of available services to create TDRSS and GN Contact Activities; the use of a NCC generator (test tool) to simulate the NCC interface; available FDF data for timeline events and scheduling calculations; and knowledge to adjust contact activities to fit the best possible profile of scheduling algorithms.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	26 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The user demonstrated the ability to create contact activities and schedule them against the mission schedule. TDRSS and Ground contact scheduling was executed. The use of batch scheduling was also demonstrated to verify the functionality of multiple scheduling and producing an optimized schedule of events. The connection with the NCC driver was not available. Ground contacts did not work with the batch mode of scheduling. The TDRSS name was incorrect for contact scheduled. The HGA angles and limits were undetected on the timeline. The following NCR's were written: Ecsed08727, Ecsed08729, Ecsed08730, Ecsed08731, Ecsed08732, Ecsed08733, and Ecsed08735.
Test Procedure Deviations:	Deviations and workarounds consisted of the following:
	System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.
	echo "Allowing Activity Definitions during OPS"
	setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %: source DataServerStartup

Real-Time Server - %: source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-5: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 11: Changed 'GND-A' to 'GN-A'.

Steps 13-16: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 18: Changed '344' to '244'.

Step 23: TDRS 3 was chosen and the Status Bar indicated TRDS7 for the scheduled contact.

Step 27: The proper ground stations was not listed in the Contact Scheduler window.

Step 28: The 'Submit' button did not work.

Step 30: Add the file extention '.1' to the TDR-A activity.

Step 33: No HGA angles were shown on the timeline.

Step 34: Change TDR-C to TDR-B. No dialog box for unavailable TRDS view.

Test Case Number and Title:	**PAS-2050B - Activity Constraint Definitions**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test will demonstrate the ability to define activity constraints. Hard and soft constraints are developed with 'order' and 'time spacing' conditions. The timeline will show the graphical representation of each violation and the associated functionality.
Pass/Fail Assessment:	PASS
Date of Test:	7 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The user defined and modified an activity constraint; showed a graphical representation of violations on the timeline; and viewed the constraint information from the timeline. The following NCR was written: Ecsed08520.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %: source DataServerStartup

Real-Time Server - %: source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 21: The selected activity was MISR_ATC1.1.

Step 23: 'Constrain' should read 'constraint'.

Step 28: Delete the word 'then' from the Should statement.

Step 29: 'Constrain' should read 'constraint'.

Steps 61-62: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 63: In order to view constraint violations on the timeline, the constraint must be defined first. The workaround at this step was to cut and reschedule the activity to show the update to the constraint definition.

Test Case Number and Title: **PAS-2110B - Scheduling Load Uplink Activities**

Reference to Test Documentation: FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:	Predefined conditions consist of the spacecraft ATC buffer cleared of any assigned memory locations; activities scheduled on the master plan that will create an ATC load and DAS; activities scheduled on the master plan to create a partitioned ATC load and DAS; and several loads generated and available (RTS, Table, MPR, and FSW) for scheduling.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	27 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The user demonstrated the generation of a Detailed Activity Schedule (DAS) and ATC loads. ATC loads were scheduled and verified against the requested and valid uplink periods. Binary (Microprocessor), Flight Software (FSW), Relative Time Sequence (RTS), and Table loads were scheduled and verified against the requested and valid uplink periods. A load uplink activity failed to schedule on a previously occupied contact of another uplink load activity. The load uplink window was altered in one case. The DAS/ATC load generation process deleted and existing scheduled load uplink activity from the timeline as well. The following NCR's were written: Ecsed08717, Ecsed08718, Ecsed08720, Ecsed08721, Ecsed08722, Ecsed08739, Ecsed08768, Ecsed08788, Ecsed08789, Ecsed08793.
Test Procedure Deviations:	Deviations and workarounds consisted of the following:
	System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.
	echo "Allowing Activity Definitions during OPS"
	setenv PASMODE TEST
	Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:
	Data Server - %: source DataServerStartup
	Real-Time Server - %:source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 9: The plan was opened from 1997/239 - 1997/241.

Step 10-11: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 12: The DAS start and stop times are as follows:

START   1997/240 03:30:00

STOP   1997/240 06:00:00

DAS uplink times are as follows:

START   1997/240 01:00:00

STOP   1997/240 03:00:00

The process hung before sending the information to CMS. The following commands were executed from the UNIX prompt on the Data Server:

%: kill <FpLoadQueuer ID>

%: kill <FmScheduleController ID>

%: ps -a   (verify processes are down)

From the directory, /fosb/test/am1/config/, the lq.db file was removed.

%: rm lq.db (confirm yes)

The startup of each process was done using the following commands from the /fosb/test/am1/scripts/setup/ directory:

%: FmScAM1ScheduleController &

%: st_lq

At the User Station, the Load Generator was recycled with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: kill (LoadGenerator ID>

%: ps -a   (verify processes are down)

%: st_lg

The DAS/ATC load information was reentered and submitted.

Steps 13-15: Remove the steps.

Step 16: The valid uplink period was recalculated for a different period and scheduled on two contacts. A load uplink activity was deleted from the timeline.

Step 17: Change 'Close' to 'Quit'.

Steps 18-20: There is no FUI/PAS interface therefore, the PAS tools are started with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: st_ls -loadname <name> -size <n> -partitions

    <n> -validStart <date:time> -validStop

    <date:time>

Step 21: Added the step to select a load uplink activity. Click the 'OK' button to confirm.

The load uplink scheduled failed due to locked DAS period. Rescheduled the load uplink beyond the locked DAS period.

Steps 23-24: Remove the steps.

Step 25: There is no FUI/PAS interface therefore, the PAS tools are started with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: st_ls -loadname <name> -size <n> -partitions

    <n> -validStart <date:time> -validStop

    <date:time>

Failed to schedule on a contact with an existing load uplink activity.

Steps 26-28: Remove the steps.

Step 29: There is no FUI/PAS interface therefore, the PAS tools are started with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: st_ls -loadname <name> -size <n> -partitions

    <n> -validStart <date:time> -validStop

<date:time>

Steps 30-32: Remove the steps.

Steps 33-37: There is no FUI/PAS interface therefore, the PAS tools are started with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: st_ls -loadname <name> -size <n> -partitions

   <n> -validStart <date:time> -validStop

   <date:time>

Steps 38-40: Remove the steps.

Steps 41-43: There is no FUI/PAS interface therefore, the PAS tools are started with the following UNIX commands from the /fosb/test/am1/scripts/setup/ directory:

%: st_ls -loadname <name> -size <n> -partitions

   <n> -validStart <date:time> -validStop

   <date:time>

Steps 44-46: Remove the steps.

Test Case Number and Title:	**PAS-2180B - Receive & Schedule Late Change Requests**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	The test will demonstrate the ability to schedule activities on the timeline; identify any constraint violations; create a DAS successfully; and regenerate a DAS with requested changes.
Pass/Fail Assessment:	PASS
Date of Test:	29 August 1997; EOC - GSFC Building 32
Test Conduct Summary:	The user Successfully identified constraint violations; generated a DAS; unlocked a DAS (resources); and regenerate a DAS across the same period. Partitioning the ATC load was not verified through the procedure. The following NCR was written: Ecsed09049.
Test Procedure Deviations:	Deviations and workarounds consisted of the following: System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file

contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %: source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Steps 8-9: These steps were executed in the setup.

Step 14: Enter appropriate start and stop times.

Steps 17-18: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 26: Could not schedule TDRS contacts prior to the test therefore, the ATC load was not scheduled.

Step 31: Remove the step.

Step 33: Could not schedule TDRS contacts prior to the test therefore, the ATC load was not scheduled.

Test Case Number and Title:	**PAS-2190B - What-If Planning & Scheduling**
Reference to Test Documentation:	FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test will begin with the creation of what-if plans on the timeline. The test will demonstrate the viewing options, saving capabilities and deleting functions. The effects to the Master Plan is also demonstrated with the what-if exercises. The test will move into the cut/copy/paste functionality across plans as well.
Pass/Fail Assessment:	PASS
Date of Test:	8 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The user created what-if plans; showed no affects to the Master Plan as what-if plans were saved and deleted; and demonstrated the privileges in accordance with plan ownership for using the cut/copy/paste functionality. The following NCR was written: Ecsed08534.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server - %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station - %:source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Steps 24, 34, 39, & 42: Change 'OK' to 'Yes'.

Step 27: Change 'Stan1' to 'Stan2'.

Steps 50-53: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Step 60: It took several tries to select more than one activity on the timeline.

Test Case Number and Title: **PAS-2200B - DAS Generation**

Reference to Test Documentation: FOS Release B Integration and Acceptance Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test will begin with creating a test bed of activities needed to formulate an ATC load, violate command constraints, and populate a DAS period. The DAS/ATC is generated at this point to verify the capability to check ground directives against schedule constraints. The

notification of constraint violations should appear during DAS generation. Hard constraint violations are tested which should prohibit DAS\ATC generation. The performance of creating a DAS with 1000 activities is tested as well.

Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	29 August 1997; EOC - GSFC Building 32

Test Conduct Summary: The user demonstrated the ability to flag constraint violations and display their definitions; the ability to remove the violating activities; the ability to create a DAS across the requested time period; and the ability to create a DAS with specified load outputs within a short period of time. The following NCR's were written: Ecsed08713 and Ecsed08714.

Test Procedure Deviations: Deviations and workarounds consisted of the following:

System Setup: A setup.$USER file was created in the user's home directory, /home/fostest1/. This file contained the following environment variable so activities could be saved in the Operational environment.

echo "Allowing Activity Definitions during OPS"

setenv PASMODE TEST

Steps 1-3: The Data Server, Real-Time Server, and User Stations were up before the start of the test. The startup of each system was done through the a UNIX shell prompt using the following commands from the /fosb/test/am1/scripts/setup/ directory:

Data Server -   %:source DataServerStartup

Real-Time Server - %:source RealTimeServerStartup

User Station -   %:source UserStationStartup.pas

Steps 4-7: There is no FUI/PAS interface therefore, the PAS tools are started with the User Station startup script.

Steps 8-9: The steps were completed in the setup.

Steps 10-18: Could not execute the steps due to problems with scheduling contacts.

Step 21: The DAS generation failed due to the PROCS scheduled on the timeline. The PROCS were deleted and the DAS was generated successful.

Step 26: Change 'OK' to 'Close'.

Step 27: SSR plots did not appear on the timeline with the scheduled activities with modes of operation.

Steps 32-35: There were no contacts scheduled therefore, no load uplikns were scheduled for the ATC load.

3.3.2.12 Telemetry Test Group

This section presents the detailed result information for test TLM-2000B (Decon Health & Safety/Standby TLM), TLM-2010B (Decom-Housekeeping TLM), TLM-2020B (Decom Context Dependent TLM), TLM-2030B (EngineeringUnit Conversion), TLM-2040B (User Adjust of EU Conversion), TLM-2050B (Multi-Byte Parameter Processing), TLM-2070B (Data Quality Determination, TLM-2080B (Red/Yellow Limits Processing, TLM-2090B (Delta Limits Processing), TLM-2150B (RealTime Data Dropout), TLM-2160 (Real-time TLM Archive and Merge, TLM-2170 (Multiple Source TLM Data Rec & Display, and TLM-2190B (TLM Replay Processing and Display.

Test Case Number and Title:	**TLM-2000B - Decom Health and Safety/Standby Telemetry**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to receive spacecraft/instrument Health & Safety and Standby CTIU EDOS Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.
	Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated, broadcasting Health & Safety telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and snapped at specified times. Raw parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted

raw values for specified mnemonics. The above steps are repeated for Standby CTIU telemetry processing.

Pass/Fail Assessment: PASS

Date of Test: 29 July 1997; EOC-GSFC Building 32

Test Conduct Summary This test successfully verified the ability to receive spacecraft/instrument Health & Safety and Standby CTIU EDOS Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Test Procedure Deviations: Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Steps 8 was performed before step 7.

Test Case Number and Title: **TLM-2010B - Decom - Housekeeping Telemetry**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the ability to receive spacecraft/instrument Housekeeping Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated, broadcasting Houskeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and snapped at specified times. Raw parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics.

Pass/Fail Assessment: PASS

Date of Test: 29 July 1997; EOC-GSFC Building 32

Test Conduct Summary

This test successfully verified the ability to receive spacecraft/instrument Housekeeping Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Test Procedure Deviations:

Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Steps 8 was performed before step 7.

Test Case Number and Title: **TLM-2030B - Engineering Unit Conversion**

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:

This test is designed to verify the FOS' capability of providing conversions from raw values to Engineering Units (EU's) for all AM-1 supported real-time telemetry types. The basic demonstration will utilize test mnemonics with conversion curves and telemetry locations modeled after project defined mnemonics.

Following sign-on, alphanumeric telemetry pages which visually associate parameter and associated parameter EU value displays are invoked at the EOC user station. The telemetry data driver is initiated, broadcasting Housekeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and parameter EU conversions are displayed, telemetry displays are snapped. Parameter EU values as shown on alphanumeric displays are analyzed post-test to ensure EU values match the converted raw value when each parameter's database defined calibration coefficient is applied. The above steps are repeated for Health & Safety and Standby telemetry streams. This test is designed to verify the ability to receive spacecraft/instrument Housekeeping Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Pass/Fail Assessment: PASS

Date of Test:	12 August 1997; EOC-GSFC Building 32
Test Conduct Summary	This test successfully verified the FOS' capability of providing conversions from raw values to Engineering Units (EU's) for all AM-1 supported real-time telemetry types. A line segmented mnemonic with more than 15 point pairs passed validation, which warranted an NCR (#9040).
Test Procedure Deviations:	Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.
	Step 7 the ECL directive had to be entered twice.
	Step 9 add verification of mnemonic GNC_SR_LSEG1.
	Step 19 add verification of mnemonic GNC_SR_LSEG1.
	Step 22 another user on system at same time entered command to remove all endpoints from data server and real-time server.
	Step 22 had to bring user station down, recycle the servers and bring the user station back up and resume.
Test Case Number and Title:	**TLM-2040B - User Adjustment of EU Conversion Algorithm and Coefficients.**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to adjust polynomial EU conversion algorithm information for specified mnemonics, including the selection of a conversion algorithm or its coefficients on a temporary basis. Error condition handling (i.e. attempting to select non-existent algorithms; attempting to select illegal coefficients), and tailored/mirrored processing of algorithm changes is also included in this test case.
	Following sign-on, an alphanumeric telemetry page which includes EU conversion values is invoked at the user station. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and snapped at specified times at both tailor and mirror-mode configured user stations. These specified times will coincide with EU changes

initiated by the user in the form of the "EU" ECL directive options. EU values residing on alphanumeric displays are analyzed post-test to ensure values match EU values when PDB information and/or EU changes initiated by the user are applied.

Pass/Fail Assessment: PASS

Date of Test: 27 August 1997; EOC-GSFC Building 32

Test Conduct Summary   This test successfully verified the ability to adjust polynomial EU conversion algorithm information for specified mnemonics, including the selection of a conversion algorithm or its coefficients on a temporary basis. Error condition handling (i.e. attempting to select non-existent algorithms; attempting to select illegal coefficients), and tailored/mirrored processing of algorithm changes were also included in this test case. NCR written 08684.

Test Procedure Deviations: Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 7 Entered ECL directive incorrectly (misspelling). Once it was re-entered, test was resumed.

Step 28 Entered directory path incorrectly. Message "No such file or directory" appeared. Re-entered the path correctly and resumed test.

Step 51 Immediately prior to this step added "Refresh" of Data Source Selector steps in order to ensure proper display page values. The display page "TLM2040B" disappeared.

Step 51 Brought alphanumeric display page "TLM2040B" up again and switched connections and resumed test.

Step 57 Entered ECL directive incorrectly (left String ID off the directive). Once it was re-entered, test was resumed.

Step 57 Changed value of change of coefficient in order to demonstrate a change.

Step 59 Changed value of change of coefficient in order to demonstrate a change.

Steps 66 and 67 deleted from test.

Test Case Number and Title:	**TLM-2050B - Multi-Byte Parameter Processing**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to decommutate and convert multi-byte parameters (contiguous and non-contiguous) in real-time telemetry formats.
	Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter decom value displays are invoked. The telemetry data driver is initiated, broadcasting values for previously defined multi-byte parameters. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and printed at specified times. Parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics.
Pass/Fail Assessment:	PASS
Date of Test:	25 August 1997; EOC-GSFC Building 32
Test Conduct Summary	This test successfully verified the ability to decommutate and convert multi-byte parameters (contiguous and non-contiguous) in real-time telemetry formats. An NCR was verified during the test (#08338) which dealt with multi-byte parameter processing.
Test Procedure Deviations:	Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.
	Step 10 was redlined to reflect the proper ECL directive and the mnemonics on the display page.
	Step 18 was redlined to reflect the proper command to enter in the terminal window.
	Step 19 was redlined to reflect the proper ECL directive for the telemetry driver's speed.
Test Case Number and Title:	**TLM-2070B - Data Quality Determination**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to report on telemetry packets containing bad quality status.

Following sign-on, an alphanumeric telemetry page "Quality", which includes parameter Decom value and associated flags is invoked at the user station. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received from EDOS, alphanumeric displays and event messages are analyzed to ensure quality flags displayed are for parameters residing in bad quality packets, and that event messages/alarms are generated during the bad quality data receipt condition(s). The above steps are repeated for Health & Safety telemetry.

Pass/Fail Assessment: PASS

Date of Test: 01 August 1997; EOC-GSFC Building 32

Test Conduct Summary This test successfully verified the ability to report on telemetry packets containing bad quality status. An NCR was written (#08205) against a 21 character mnemonic in the header page in which the last character was being cut in half.

Test Procedure Deviations: Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 4 redlined to include mouse click on "OK".

Step 5 iconified status window after connecting to string.

Step 6 redlined to only Header page information in verification.

Step 15 redlined to perform after step 16.

Step 16 redlined command for telemetry driver.

Step 19 checked during the fifth master cycle vs. second.

Step 19 steps 9-14 repeated to ensure proper channel was selected.

Step 21 snapped page at packet 22.

Step 23 snapped page at packet 0.

Step 25 user typed in wrong character, backspaced and then resumed.

Step 27 monitored for two master cycles vs. one master cycle.

Test Case Number and Title:	**TLM-2080B - Red/Yellow Limits Processing**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to report on individual telemetry parameter limit violations according to a given parameter's associated raw/EU limits database definition. This test will also verify the ability to change limits information via ECL directives.
	Following sign-on and initiation of the I&T database as the operational database and initialization of a real-time string in support of the AM-1 spacecraft, alphanumeric display pages and the real-time events page are invoked. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN at a rate of 16 kbps. Limit conditions are simulated, ranging from red low limit violation to red high limit violations; alphanumeric and event pages are snapped at specified periods and compared against scripted limits conditions to determine accuracy of limits reporting.
Pass/Fail Assessment:	PARTIAL PASS
Date of Test:	28 August 1997; EOC-GSFC Building 32
Test Conduct Summary	This test successfully verified the ability to report on individual telemetry parameter limit violations according to a given parameter's associated raw/EU limits database definition. This test unsuccessfully verified the ability to change limits information via ECL directives. The ECL directives were unsuccessful in selecting limit set groups and changing Red/Yellow high/low limits. Three (3) NCR's were verified during the test. These NCR's include (#04446, 8339, 8286). Four (4) NCR's were written during the test. These NCR's include: (#08746) - limit group selection; (#08750) - limits on/off parameter level; (#08751) - limit sense interval adjustment, (#08748) limit group selection failure.
Test Procedure Deviations:	Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.
	Step 8 redlined to reflect current event message.
	Step 18 redlined to reflect event message only.
	Step 36-47 redlined to reflect current ECL directives.

| **Test Case Number and Title:** | **TLM-2090B - Delta Limits Processing** |

Reference to Test Documentation: FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary: This test is designed to verify the ability to delta limit check telemetry parameters during the decommutation process based on delta limit definitions in the operational PDB and report on delta limit violations via event message and alphanumeric page display flag fields.

Following sign-on, and initiation of the I&T database as the operational database and initialization of a real-time string in support of the AM-1 spacecraft, alphanumeric display pages and the real-time events page are invoked. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN. Delta limit conditions are simulated, alphanumeric and event pages are snapped at specific periods and compared against scripted delta limit conditions to determine accuracy of delta limits reporting.

Pass/Fail Assessment: PASS

Date of Test: 12 August 1997; EOC-GSFC Building 32

Test Conduct Summary This test successfully verified the ability to delta limit check telemetry parameters during the decommutation process based on delta limit definitions in the operational PDB and report on delta limit violations via event message and alphanumeric page display flag fields.. An NCR (#5949) was written concerning adjustment of delta limits. One NCR (#5949) concerning delta limits was verified during the test. An NCR dealing with the adjustment of limit sense interval was unverified and is still outstanding. The adjustment of limit sense interval via ECL directives does not work.

Test Procedure Deviations: Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 24 redlined to reflect current ECL directive to turn all limits off.

Step 25 redlined to reflect Support LAN port.

Step 26 redlined to reflect event message displayed in the event display.

Step 42 redlined to reflect Support LAN port.

Step 52 redlined to reflect Support LAN port.

Step 58 redlined to reflect current ECL directive to change delta limits.

Step 61 redlined to reflect current ECL directive to change limit sense interval.

Test Case Number and Title:	**TLM-2150B - Real-Time Data Dropout**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the ability to mark individual telemetry parameters as "static" when one of two conditions exist: (1) The telemetry stream has not been received for a 5 second period, or (2) data has not been received for any given parameter within a spacecraft master cycle period.
	Following sign-on, alphanumeric telemetry pages which include visually associate parameter decom values are invoked at EOC user stations. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN at a rate of 16 Kbps. Data TLM-2150BHS periods are simulated, ranging from one to multiple packets. As telemetry packets are received and EU conversions are displayed, alphanumeric displays are printed. Static indicators associated with each parameter are compared against TLM-2150BHS periods in order to verify timely flagging of static indicators for each parameter.
Pass/Fail Assessment:	PASS
Date of Test:	01 August 1997; EOC-GSFC Building 32
Test Conduct Summary	This test successfully verified the ability to mark individual telemetry parameters as "static" when one of two conditions exist: (1) The telemetry stream has not been received for a 5 second period, or (2) data has not been received for any given parameter within a spacecraft master cycle period.
Test Procedure Deviations:	Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 15 did not log off user station due to time constraints and other tests which would immediately follow.

Test Case Number and Title:	**TLM-2160B - Real-Time Telemetry Archive**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)

Test Summary:

This test is designed to verify the ability to archive Housekeeping and Health & Safety and Standby packets and provide unique catalog entries for all archived telemetry.

Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated, broadcasting Housekeeping, Health & Safety and Standby telemetry onto the FOS LAN, each stream broadcast in sequential time order. Access to the archive will be performed during and after the archive process to ensure proper cataloging of received data. Test steps will then be provided to display, dump and compare archive content with test tools.

Pass/Fail Assessment: PASS

Date of Test: 01 August 1997; EOC-GSFC Building 32

Test Conduct Summary

This test successfully verified the ability to archive Housekeeping and Health & Safety and Standby packets and provide unique catalog entries for all archived telemetry.

Test Procedure Deviations:

Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 18 redlined to reflect all keyed entries to verify the archived file.

Step 21 redlined to reflect all keyed entries to verify the archived file.

Step 24 redlined to reflect all keyed entries to verify the archived file.

Step 33 redlined to reflect all keyed entries to verify the archived file.

Step 36 redlined to reflect all keyed entries to verify the archived file.

Step 39 redlined to reflect all keyed entries to verify the archived file.

Test Case Number and Title:	**TLM-2170B - Simultaneous Data Receipt I-Q Channel**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test is designed to verify the FOS' capability of providing telemetry processing of telemetry streams received on the I and Q channels simultaneously. The user will be using a driver called "FtPgPackGen" to flow data on both channels. The updating display pages will provide verification of simultaneous data receipt. Following sign-on, two alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. One page will monitor the I channel and the other page will monitor the Q channel. The telemetry driver is initiated, broadcasting Housekeeping, Health & Safety and Standby telemetry simultaneously on the I and Q channels. The pages will update simultaneously with each type of data.
Pass/Fail Assessment:	PASS
Date of Test:	12 August 1997; EOC-GSFC Building 32
Test Conduct Summary	This test successfully verified the FOS' capability of providing telemetry processing of telemetry streams received on the I and Q channels simultaneously. The telemetry driver called "FtPgPackGen" was used to flow data on both channels. The updating display pages provided verification of simultaneous data receipt. The test was run up to step 38 and the display pages stopped updating (a problem discovered prior to the running of this test; which was later fixed). User station was brought down and then back up again and test was continued from step 38 with no additional problems. An NCR (#08254) was written against the data source selector as it continued to lock the entire screen. An NCR (#08253) was written due to the inability to deactivate the "ACK" button in the control window.
Test Procedure Deviations:	Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 57 alphanumeric display pages stopped updating and the screen became locked (unable to close windows, etc.) so test was restarted.

Step 53, once restarted test display pages stopped updating and "ACK" button became engaged, but the user was not able to click the mouse on it. Test was restarted once again.

Step 38 the display pages stopped updating and the user station was recycled and test resumed.

Step 64 deleted (actually a repeat of Step 63).

Test Case Number and Title:	**TLM-2190B - Telemetry Replay Processing and Display**
Reference to Test Documentation:	FOS Release B Integration and Test Procedures (322-CD-007-002/411-CD-007-002)
Test Summary:	This test verifies the ability to replay stored real-time and spacecraft recorder telemetry via menu options provided by the Replay Controller Tool and other user interface supplied menu options. A secondary objective is to ensure processing of replayed data mimics real-time telemetry processing including decomutation, EU conversion, limit/delta limit checking, data quality checking and subsequent display of parameter values and flags.

The test begins with the initialization of the replay logical string, and the initialization of several EOC user stations in support of the replay string. The Replay Controller Tool is invoked, and pre-defined replay alphanumeric telemetry pages, telemetry plots, telemetry strip charts and telemetry schematics are displayed at various user stations. Replay information (i.e. spacecraft ID, start/stop time, data type, replay time) is entered via selected Replay Controller menu options. The replay of housekeeping telemetry is initiated and display pages, plots, graphs and schematics are displayed and printed. They are analyzed and compared post-test against telemetry archive file dumps (and against each other) to ensure accurate parameter value (raw or EU) and/or flag display (i.e. static, limits, delta limits, quality). Steps are provided to pause and resume the replay at a new begin

time via the selection of Replay Controller options. The above steps are repeated for the replay of Health & Safety and diagnostic telemetry packets.

Pass/Fail Assessment: PASS

Date of Test: 22 August 1997; EOC-GSFC Building 32

Test Conduct Summary This test successfully verified the ability to replay stored real-time and spacecraft recorder telemetry via menu options provided by the Replay Controller Tool and other user interface supplied menu options. A secondary objective is to ensure processing of replayed data mimics real-time telemetry processing including decomutation, EU conversion, limit/delta limit checking, data quality checking and subsequent display of parameter values and flags. The test was stopped after the request for shared replay was submitted. Two NCRs (#7881, #08682) have been written concerning shared replay and display of current time respectively.

Test Procedure Deviations: Steps 1 and 2 were not performed as the Data Server and Real-Time server were already up and running.

Step 9 last mnemonic on display page redlined to be CDH_CR_SBDLTA2.

Step 35 redlined time to 2:36.

Step 36 redlined time to 4:10.

Step 46 redlined to reflect user ability to bring up alphanumeric display page.

Step 49 the replay controller failed to create the necessary string for shared replay.

3.4   FOS Requirements Status

The FOS Test Program focused on the verification of FOS RBR requirements as specified in the Functional and Performance Requirements Specification (#423-41-02), non mission-specific level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 1 (#304-CD-001-003) and mission-specific Level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 2 (#304-CD-004-003). The following tables (Table 3.4-1 and 3.4-2) represent the verification status of these requirements resulting from the execution of test procedures during the formal FOS Release B Acceptance Test Phase.

Table 3.4-1. FOS Level 4 Requirements Status

Subsystem	Pass	Partial	Fail	Unverified	Totals
ANA	35	7	10	122	174
CMD	69	7	5	11	92
CMS	90	25	11	19	145
DMS	43	24	8	30	105
FOS	46	7	0	30	83
FUI	181	113	18	99	411
HRD	70	4	0	0	74
PAS	58	33	11	26	128
RMS	24	6	3	15	48
TLM	80	26	10	41	157
Totals	696	252	76	393	1417
	49 %	18 %	5 %	28 %	

Table 3.4-2. FOS RBR Requirements Status

Req't Type	Pass	Partial	Fail	Unverified	Totals
AM1	15	15	0	3	33
ASTER	6	14	1	5	26
EOC	21	141	5	6	173
EOSD	32	24	0	5	61
EDOS	8	8	1	8	25
ESN	0	0	0	1	1
FOS	3	9	0	3	15
ICC	27	118	4	21	170
NI	10	8	3	2	23
Totals	122	337	14	54	527
	23%	64%	3%	10%	

3.5   FOS NCR Status

Non-conformance reports (NCRs) are generated during the dry-run and formal test period by cognizant test engineers, Quality Assurance, NASA witnesses and programmers during the dry-run and formal test periods. In general terms, NCRs are generated for any of the following general circumstances: 1) Any requirement which is not provided by the FOS software as a whole or only partially provided; 2) Any provided functional software/hardware "piece" where that "piece" is not fully functional 3) useability of the tested function does not meet operational standards.

NCRs are broken down into 3 priority categories. Level 1, 2 and 3. Level 1 NCRs are those which inhibit operational functionality, thus rendering any further testing as futile (i.e. show-stoppers). Level 2 NCRs are those which inhibit a specific function from working nominally,

but a workaround is available. Level 3 NCRs are those which affect "look and feel" of specific functions but do not hamper associated functionality.

The following tables (Tables 3.5-1 and Table 3.5-2) represent the FOS NCR status resulting from the execution of test procedures during the formal test timeframe .

Table 3.5-1. TRR FOS NCRs

Severity	Open	Fixed	Closed Verif	Totals
Level 1	0	6	7	13
Level 2	109	41	27	177
Level 3	121	69	31	221
Totals	230	116	65	411

Table 3.5-2. RRR FOS NCRs

Severity	Open	Fixed	Pending Verif	Closed Verif	Totals
Level 1	51	6	32	54	143
Level 2	399	24	123	219	705
Level 3	344	123	59	188	610
Totals	734	49	214	461	1458

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